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HYPNOSIS AND POSTHYPNOTIC SUGGESTIONS

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CHAPTER I. THE HYPNOTIC STATE

Hypnosis is one of many altered states of consciousness (ASC). The ASC is characterized by various deviations from the normal conscious state (NSC) which then will be a name for the state in which the individual spends the main part of his wakefulness. Ludwig (Tart, 1969) regards ASC as "any mental state, induced by various physiological, psychological or pharmacological maneuvers or agents, which can be recognized subjectively by the individual himself or by an objective observer as representing a sufficient deviation in subjective experience or psychological functioning from certain general norms for that individual during alert, waking consciousness."

Deviations must be of qualitative character i.e. adding, disappearing or changes of mental processes. In the western world the attitudes have for long been negatively turned against ASC, perhaps because of the fact that we principally have worked with different pathological forms of ASC and find it difficult to differentiate between the desired and the undesired ASC. Research within this area has until now only encompassed a few ASC, and very little has been done to organize this scattered information into a consistent theoretical system.

There exist a lot of induction methods for hypnosis and it is often surprising to realize how they differ from each other. This even applies to other ASC. Ludwig (Tart, 1969) says that the ASC can arise by interference with the normal inflow of sensory stimulation, by the normal inflow of motoric impulses, the normal emotional state of being and the normal flow and organization of cognitive processes. This interference can consist of both an increase or a decrease of activity and Ludwig therefore divides the methods into a few categories..

1. Reduction of exteroceptive stimulation and/or motor activity (various states of deprivation, sleep etc.).
2. Increase of exteroceptive stimulation and/or motor activity and/or emotion (excitatory mental state for instance ecstasy). due to sensory overload or bombardment).

3. Increased alertness or mental involvement (focused or selective hyperalertness).
4. Decreased alertness or relaxation of critical faculties (passive states of mind, in which active good-directed thinking is minimal).
5. Presence of somatopsychological factors (resulting from alterations in body chemistry or neurophysiology either deliberately induced or spontaneous).

The induction methods for hypnosis are commonly based upon a combination of auditive and visual stimulation sometimes also combined with the tactile stimulation but there are also induction methods which exclusively use one of these three ways.

Ludwig also describes common denominators or features in ASC, in spite of the fact that everyone, due to cultural expectations, demand characteristic communication factors, transference feelings, motivations and expectations, has a unique flavor of its own.

Similar features among different ASC are:
Alterations in thinking (decreased reality-testing, increased primary process thinking), in time sense, in emotions, in perceptions, in body image, in suggestibility, in meaning, in control. These changes can also be experienced during hypnosis but according to my opinion there is a basic difference between hypnosis and many other forms of ASC, and that is in the question of control. While most ASC is characterized by a decrease or loss of control, hypnosis implies increased control. During LSD-influence one has for example a very limited ability to influence and steer the changes which take place, one is forced to live through whether one likes it or not. The changes appearing during hypnosis, are mainly caused by explicit or implicit suggestions, imaginations and expectations and they are only to a less degree spontaneous, caused by the hypnotic state per se.

In this chapter the most important theories of hypnosis will be discussed, hypnosis will be compared with some adjacent fields like relaxation, sleep, meditation, and imagination, and, finally, different proposed criteria for the hypnotic state will be evaluated.

Hypnosis

Hypnosis in one form or another and to some extent has been found in all cultures, the activities of which have been sufficiently described. The oldest description of hypnosis goes back as far as 2000 B.C. The purpose of hypnosis has varied although hypnotic phenomena are well-nigh universal. Modern hypnosis began through the attention attracted to it by Mesmer in the end of the eighteenth century. A hundred years later, hypnosis was incorporated in the medical research by Charcot and Bernheim, and some years into this century it took a place also in the psychological research.

Despite this long history, it is hard to specify just what hypnosis is. Our language is not very suitable for specifying states of awareness, because they are not stable enough to permit exact labelling. Such phenomena have, for that reason, been ignored by many behaviorists.

In spite of these difficulties, lots of theories on hypnosis have been presented during the last thirty years. As in the fable of the elephant, who was touched in different places by the four blind men, many investigators of hypnosis have formulated a new and different theory. Not all theories of hypnosis are concerned with the same aspects of hypnosis. For convenience, one may classify them as theories of induction, theories of the established hypnotic state, and theories of differential susceptibility to hypnosis. A more general theory would attempt to encompass all of these aspects. An attempt to classify and evaluate the most important theories will be presented.

Historical theories - Mesmer's theory on hypnosis as a manifestation of "animal magnetism" belongs here as well as the theories of Charcot (1890), Binet (1888) and Janet (1920), who regarded hypnosis as a pathological phenomenon - a hysterical symptom. The hypothesis on some relationship between hypnosis and hysteria has, however, not been verified in modern investigations (Eysenck, 1953).

Physiological theories - Many theories contend that hypnosis

is due to a changed physiology of the cerebral cortex: inhibition of the ganglion cells of the brain (Heidenhain, 1906), inhibition of one set of mental functions and excitation of others (Young, 1941); cerebral anemia (Hart, 1882); shift of nervous energies of the central nervous system to the vasomotor system (McDougall, 1926); and vasomotor decerebration involving anemia of the frontal lobes (Volgyesi, 1938). Others contend that hypnosis is due to a focus of central excitation with surrounding areas of inhibition (Kubie, Margolin, 1944). Another theory (Estabrooks, 1943) posits that hypnosis is due to "synoptic ablation": neural impulses are directed into a smaller number of channels.

The physiological theories so far have not succeeded satisfactory in explaining the hypnotic phenomena. The empirical support is more weak than for other more psychological theories.

Role-theories - White (1943) defined hypnosis as a meaningful goal-directed striving, where the individual strives to behave like a hypnotized person. This interpretation gives motivational factors a central role in the dynamics of hypnosis.

Sarbin (1954) enlarged the theory of White and expressed it in social psychological terms. The success of the attempt to behave like a hypnotized person is according to Sarbin a function of three factors: favorable motivation, the perception of the role and the ability of role-taking (as-if behavior). Sarbin regards hypnosis as the middle point of a continuum from exstatic, mystical experiences where the role and the ego are undifferentiated over to "technical acting" with a clear separation of the role and the ego. In recent years, Sarbin has adopted the expression role-enactment for the earlier role-taking, in order to get away from the implication of deliberate play-acting in hypnosis.

Barber (1969) prefers to write "hypnosis" in quotation marks, implicating that there is no need for any assumption of a special state. He does not deny the phenomena, usually called hypnotic,

but he denies the need of a formal hypnotic induction to produce them.

The role-theories or the non-state theories, though accepted by many, have difficulties in explaining the phenomena which differ between hypnotic subjects from waking and simulating subjects.

State-theories - Most investigators and clinicians in the hypnotic field regard hypnosis as a special state, as a rule an altered state of consciousness. On the other hand, there are large variations in opinions about the characteristics of this special state and about which processes are responsible for the origin of this state. Shor (1959) means that hypnosis appears when the normal generalized reality orientation is weakened or disappearing. Simultaneously with a nonfunctional awareness, a special temporary orientation to a limited group of stimuli arises.

Weitzenhoffer (1953) explains hypnosis as an interaction between three different mechanisms:

1) Homoaction or the ideo-motor tendency, a process through which thoughts and imaginations create sub-liminal motor responses, increasing in strength by repeating.
2) Heteroaction, a generalization of the response strength to all suggestions, based on abstract conditioning.
3) Dissociation, a selective separating of all stimuli, except those coming from the hypnotist.

Dissociation has played a major role in many older theories. Most of the criticisms of dissociation theory, as proposed by Janet et al.(1920) rely on the lack of complete independence between the split-off activities that are claimed to be dissociated. Hilgard (1973) has presented a neo-dissociation theory of multiple cognitive controls in hypnosis, which accepts the interference between simultaneous activities as an empirical fact, but which claims that the hypnotized subject, carrying on with one set of activities, may be totally unaware of the other set. Hence, the controls operating

for the two activities can be considered dissociated even though the activities are not completely independent. Experiments have indicated a hidden cognitive part of a person, the presence of which causes special problems for a theory of cognitive controls, without contradicting the conception of a dynamic unconsciousness.

Psychoanalytical theories regard hypnosis as a situation of transference where the hypnotist is a symbol for the hypnotized super-ego. A progressive elimination of all channels of sensory-motor communication between the hypnotized person and the surroundings will expand the ego-borders and produce a fusion between the hypnotizer and the hypnotist.

Other theories emphasize more the ego and speak of a regression in the service of the ego. Meares (1972) regards hypnosis as an "atavistic regression", a regression not to a former behavior but to a former, more archaic, level of mental functioning.

Hypnosis as a kind of sleep will be discussed in the next section.

Communication theory - Another contribution to the field of theory is communication analysis. The Russians, having adopted Pavlov's second signal system as most relevant to hypnosis, early began to emphasize the word as basic in hypnosis (Platonov, 1959). Kubie and Margolin (1944) discussed the hypnotist's voice becoming part of the subject's ego, and this kind of interpretation was extended by Miller, Galanter, and Pribram (1960), who indicated that the subject's self-planning that commonly goes on through talking to himself, may be taken over by the hypnotist.

Berger (1972) regards hypnosis as a self-organizing mechanism, that compensates for the reduced stimulation in the hypnotic induction. These compensatory mechanisms increase the vividness of the hypnotic suggestions.

Comments

It was mentioned before that theories of hypnosis may be classified as 1) theories of induction, 2) theories of established hypnotic state and 3) theories of hypnotic susceptibility. The communication theories belong above all to the first group, and therefore there is no real opposition between them and the other mentioned theories, belonging to the second group. An interesting theory which is referred to the third group (the developmental - interactive theory) will be described in the next chapter.

To the third category belong the so called "trait theories" in which the susceptibility to hypnosis is looked upon as a relatively stable and consistent personality trait. I will make an attempt to combine the opinions about hypnosis as a special state and as a special trait. It is possible to find predessors for everyone of the four possible combinations.

Hypnosis as a		Predecessor
State	Trait	Hilgard
State	Non-Trait	Milechnin
Non-State	Trait	Sarbin
Non-State	Non-Trait	Barber

- Hilgard not only regards hypnosis as a special state with some distinguished characteristics, for instance various partial dissociations, but he also looks at hypnotic susceptibility, measured with experimental scales, as a rather stable trait, where personality factors are of greater importance than various situation variables.
- Milechnin has a firm belief in hypnosis as an altered state of consciousness. However, in accordance with many clinicians, he considers hypnotic susceptibility as more dependent on such factors as induction method, hypnotist, training etc. than as a result of some hypnotic ability. He claims that every human being can learn to enter deep hypnosis.
- Sarbin, on the other hand, regards hypnosis as a form of role-play, but in spite of denying a state-concept his theory is still

based on a trait - "role enactment ability".

- Barber, finally, does not deny the hypnotic phenomena, but he claims that no hypnotic induction is needed in order to produce these phenomena. Intervening variables like "hypnosis" must be avoided, as the response characteristics of "hypnosis" can be explained out from the antecedent conditions.

My own position lies between Hilgard and Milechnin. I consider hypnosis as a special state (as will be seen in my attempt to define hypnosis later on in this chapter), but I am more optimistic than Hilgard about the possibility of increasing the "hypnotic ability", for instance by training the imagination and involvement (p. 23).

HYPNOSIS IN RELATION TO ADJACENT FIELDS

I. Relaxation

A rather popular way to define hypnosis is "deep relaxation" or "suggestive relaxation", emphasizing the close relationship between hypnosis and relaxation. This relationship is, however, not unambiguous.

As a rule, the onset of the hypnotic induction usually encompasses a moment of relaxation instructions. However, this is neither a necessary feature nor a characteristic elemnet in all induction methods, since there are various methods where the relaxation component is not included at all. There are even methods mainly based on gradual increase of tensing up. On the other hand, it is also a possibility to use a common instruction for progressive relaxation as the only induction method for hypnosis.

There are different viewpoints on what are the common elements in various hypnotic induction techniques. According to Barber's view (1969), there are five components which are typically included in present-day hypnotic induction procedures. These are:

1) Defining a situation to the S as hypnosis.
2) Instructing the S to close his eyes.
3) Suggestions of relaxation, drowsiness and sleep.
4) Motivational instructions.
5) Suggestions about easy responding to further test suggestions.

Only two of these five components are present in common relaxation techniques. The opinion of Barber ought, however, to be challenged. According to my point of view, the components (1,2, or 3) mentioned, are not necessary elements in a hypnotic induction procedure, and probably not even 4 or 5. If one turns to Gill and Brenman instead, one finds that they also suggested five common components in hypnotic standard induction techniques.

1) Placing extensive limits on sensory intake,

2) Limiting bodily activity,

3) Restricting attention,

4) Providing narrow and monotonous stimulation,

5) Altering quality of bodily awareness.

All these five components are also found in common relaxation training. Thus, I would like to state that differences between various induction techniques for hypnosis are larger than those between a normal method of hypnotic induction and a common instruction for relaxation. Thus, even if relaxation is not a necessary part in hypnotic induction one can still use relaxation alone as one road to hypnosis. Many therapists, using only relaxation, have noticed that some patients reach a state of deep relaxation. A closer test of this state would document that these patients are actually in a hypnotic state. This has ethical implications. Sometimes one hears expressions like: "I am only using relaxation, not hypnosis." According to my point of view, this is certainly doubtful. I think that we have so far stressed the stimuli side too much instead of the response side, we have stressed our procedures instead of the human reactions. It is not so much a question of what I "give" but more of how people react on what I give. A consequence of this would be that everyone, working with relaxation, ought to have certain knowledge in hypnosis.

Turning to the state of hypnosis, this is often considered as a state of deep relaxation. But relaxation is neither here a necessary element. It is possible, with the help of suggestions to change the relaxed state into a very tensed and uncomfortable state, but the person will still be in a hypnotic state.

Thus, relaxation is a common and sometimes the only element in hypnotic induction procedures and is mostly also a characteristic feature of the hypnotic state, but relaxation is neither a necessary element in the induction methods nor in the hypnotic state.

Another question is if hypnosis in itself can enhance the degree of relaxation and hasten the process. Wolpe earlier used hypnosis as a general technique for relaxation and he seems still to favour hypnosis: "Some patients seem to relax better in a found hypnotic state." (Wolpe, 1969). Scott (1970) means that using hypnotic technique is probably the quickest method, which also gives a superior relaxation. Some studies (Lang, 1963, 1965; Paul, 1968, 1970) have tried to compare progressive relaxation training with hypnotic or posthypnotic suggestions about relaxation but the effect has been studied with a third measure, for instance, the effect of the desensitization. The studies also manifest methodological weaknesses as they do not specify the used procedures, for instance, the amount of suggestions in the relaxation procedure and the amount of relaxation in the hypnotic induction.

A more relevant question than comparing hypnotic suggestions about relaxation with relaxation-training would be: "Will the same progressive relaxation-training give better and/or faster results in the hypnotic state than in the waking state?" To answer that question, the following study was designed (investigation under study, Uneståhl, 1974).

An instruction with progressive and differentiated relaxation was worked out. The schemata, going through the body step by step, takes about 25 minutes. The training is to be done during two conditions, the taped instruction alone (tape 1) and the instruction preceded by a hypnotic induction (tape 2). The hypnotic induction was worked out without any element of relaxation.

24 Ss were picked out according to their results on a modified version of Stanford hypnotic susceptibility scale (SHSS).

Hypnotizability	Number of Ss in each condition Tape 1	Tape 2
High susceptible	4	4
Middle susceptible	4	4
Low susceptible	4	4

During the three sessions (2-4), the groups changed tapes and a new change of tapes was made during sessions 5-7. Further three changes of tapes occurred between sessions 8-14, now with a shorter version of the relaxation instruction.

The results from the first seven sessions will be described shortly.

If the ratings of such variables as relaxation, detachment, heaviness, pleasantness, calmness and dissociation are brought together to one score, then the results from the first training session are seen in table I:1.

Table I:1 Relaxation with (tape 2) and without (tape 1) hypnosis. The effect of the first training session.

Susceptibility	Tape 1	Tape 2	Total
High	13.0	15.5	28.5
Middle	13.3	10.6	23.9
Low	9.8	10.0	19.8
Total	36.1	36.1	

The effect of the first training session seems to be somewhat related to susceptibility to hypnosis.

The next ratings, made after session 4 and session 7, compassed the same variables, but now only the change from the last ratings was marked. If unchanged position is marked with zero and change in negative or positive direction is marked from -2 to +2, then the result will be as follows (Table I:2).

Table I:2 a) Changing in ratings from session 1 to session 4.
b) Changing in ratings from session 4 to session 7.

a) Susceptible	Tape 1	Tape 2	Total
High	+8	0	8
Middle	+6	0	6
Low	-6	+6	0
Total	8	6	

b) Susceptible	Tape 1	Tape 2	Total
High	+9	+13	22
Middle	+7	+7	14
Low	+3	0	3
Total	19	20	

The group, which already after session 1 had the highest score (62) is the one changing most in positive direction (+8 and +13), while the lowest group with hypnotic induction in the first session is changing in a negative direction.

In spite of the ratings comprising such "hypnotic" variables, as detachment and dissociation, the relaxation training preceded by a hypnotic induction does not seem to give better result than the relaxation training alone.

The susceptibility to hypnosis seems, on the other hand, to be a rather important factor in predicting the results of progressive relaxation training. For the low susceptible Ss hypnosis does not add anything to their slight effect of relaxation training and for the high susceptible Ss a formal hypnotic induction does not either add much to their strong "hypnotic" effect of the relaxation training alone.

II. Sleep

The sleep-like appearance of the hypnotized subjects led Braid (1852) to coin the word hypnosis from a Greek word for "to sleep". The theorizing about the relationship between hypnosis and sleep culminated with Pavlov, who saw sleep as a state of cortical inhibition while in hypnosis, there were some excitatory islands surrounded by cortically inhibition. This viewpoint has its advocates also today, not least in Eastern Europe.

There are of course many parallels between sleep and hypnosis. The hypnotized person often appears to be asleep and he typically describes the experiences as sleeplike. The word "sleep" is also used, even today, in many induction procedures.

Many studies have been made using EEG-measurements and most results indicate that EEG during hypnosis is similar to waking EEG patterns consisting of desynchronized fast activity and alpha activity. Thus, "the available evidence suggests that there is no similarity between hypnosis and sleep in the EEG, although without independent criteria of both hypnosis and the relevant sleep stages, any hypnothesized similarity is difficult to evaluate conclusively". (Evans in Fromm-Shor, 1972). Sleep-like appearance and behavior are not necessary criteria for the hypnotic state. If a person under deep hypnosis is told to open his eyes and behave like "normal" he will be able to behave in the same active manner as would an unhypnotized subject.

Another question is to what extent hypnotic techniques could be used to influence the course and nature of specific sleep characteristics. Hypnotically induced dreams are frequently used in therapy, but hypnotic techniques have also been used to influence dream content during sleep.

A lot of studies have demonstrated that a posthypnotically suggested topic will appear in the subject's verbally reported dream. Few studies have, on the other hand, used hypnotic techniques

to influence and alter the specific characteristics of sleep and the sleep cycle. Direct suggestions have been given that Ss should be awaken at a pre-suggested time (Tart, 1970) or that Ss would be able to discriminate between REM and non-REM sleep (Antrobus and Antrobus, 1967). Arkin, Hastey and Reiser (1966) have through post-hypnotic suggestions instructed the Ss to communicate their dreams verbally, while dreaming and then continue to sleep comfortably, when the dreams are over.

Uneståhl et al. (1967) tried to get some control over the sleep-dream cycle with the help of posthypnotic suggestions. The Ss were instructed to be receptive for suggestion, given in any stage of sleep, and were then during sleep told to start dreaming. The suggestions, however, caused a disappearing of the sleep-activity, measured with EEG and EDA. The Ss returned to the sleep-activity immediately after the suggestions had been given, but the content of the suggestions was not fulfilled. During these periods of increased activity, however, the Ss gave evidence of an increased suggestibility, which indicated that the contact between the E and the Ss, established before the sleep, was still there.

Thus, it seems possible that sleep can go over directly to hypnosis in the same way as hypnosis can pass over into sleep. In a case study Uneståhl (1973) has shown that a Ss can stay in hypnosis for a considerable time (5 days and nights) and continue to have the same cycle of waking - sleep.

Sleep can be produced by hypnotic or posthypnotic suggestions, both common procedures in hypnotherapy. In order to see, if there were any differences between "natural" sleep compared with "hypnotic" or "posthypnotic" sleep, a study was carried out (Uneståhl et al., 1971 g). 3 susceptible Ss spent 4 nights each in the sleep laboratory, one night for habituation and then three nights with "hypnotic", "posthypnotic" and "natural" sleep in rotated order. With "hypnotic" sleep means that hypnosis is through suggestions directly turned over into sleep. In "posthypnotic" sleep the Ss are awakened after

hypnosis and the sleep inducing suggestions begin to work at a later moment.

Measurements were made by EEG (parieto-occipital connection) EOG (the Fenn-Hursh method), SRL and body movements (through bed-movements). The measured variables were time for time for going to sleep, the duration to the first EEG 1, EEG 3-4 and to the first REM-period, the total duration of EEG 1, EEG 2, EEG 3-4, REM and waking periods during the night (absolute and adjusted values). The number of bedmovements and number of shifts between different EEG-stages were also recorded.

The results manifest only very small differences between the various conditions. A small decrease of EEG 1, but a simultaneous small increase in REM-duration can be seen during both "hypnotic" and "posthypnotic" sleep. Two Ss manifest a considerable decrease of bedmovements during "hypnotic" sleep, and all Ss have a decrease of shifts between EEG stages, also during "hypnotic" sleep.

Thus, if the last two measures can serve as indicators of the tranquillity of the sleep, there is a trend towards more calm sleep during "hypnotic" sleep. This was also manifested in the subjective ratings (modified version of Dureman's scale for subjective experience analysis, 12 variables) made the mornings after "hypnotic" sleep.

The other measurements in the study did not show any clear differences between the conditions.

III. Meditation

A Stanford doctoral dissertation by Spencer Sherman studied the subjective nature of extreme depths as self-induced and self-reported by his subjects (Hilgard, 1973). Highly hypnotizable Ss, who subjectively describe nearly all suggestions by a number at the level of 10, will, if they are told to go deeper, report a gradual deepening which they describe by numerical values of 50 or 100 or more on the same scale.

Characteristically, at some level around a scale report of 50 they no longer respond to the questions of the hypnotist, but later at a smaller depth, they can describe the experience at the deeper level. At the deepest level, the description of the state tends to be very much that of a mystical experience - loss of the body, lack of subject - object distinction, rich imagery, the meaning of time, and an experience of depth of knowledge and insight, but of a sort that is not communicable.

This study actualizes the questions about what the similarities and differences are between hypnosis and such phenomena as meditation and yoga. Ainsley Meares (1973) claims that there are obvious clinical similarities between them. In each there is a loss of awareness of immediate surroundings, loss of logical thought, loss of criticism. There is a loss or distortion of body image and a loss of ego boundaries. There are also the experiences of subjective calm and a transcendence of discomfort and even pain. Nils-Olof Jacobsson (1973) claims that in spite of some obvious similarities there exist some basic differences. In self-hypnosis there is an active purposeful attitude of "doing something", talking to one-self or creating mental pictures, in order to make something happen. Meditation is, on the other hand, a passive "waiting" attitude, where the goal is a state of total stillness, with no thoughts or images.

In order to find out more about the relation between self-

hypnosis and meditation, a questionnaire was sent out to 6 meditation centres from where 101 forms were sent back. This material was supplemented with 14 intensive personal interviews. A selection of the extensive material is presented briefly (Uneståhl et al., 1974).

To some extent do the functions of the mantra resemble the signal released PHS. The associations to the mantra might be given during the impressive atmosphere at the initiation ceremony, which easily creates a suggestive state. The mantra will probably after this serve very much as a conditioned stimulus. Although, according to textbooks in meditation, the mantra ought to be used only during the meditation, some Ss report that they also use it for pain attacks, on visits to the dentist and other bothersome situations.

Bodily sensations such as warmth, heaviness and lack of body identity, are reported in a similar way by Ss in meditation or in self-hypnosis.

Only a few Ss experienced a time distortion during the meditation, while the majority had no difficulties in limiting the duration of the meditation. Ss, trained in self-hypnosis, have also a possibility to control the common time distortion during hypnosis by determining the duration of hypnosis before he enters the trance. Time estimations about the duration of the hypnosis or the meditation, seem to be more distorted after hetero-hypnosis compared with self-hypnosis or meditation.

Noises and external disturbances have a lower signal value during meditation and self-hypnosis and are usually more passively registered.

A claimed difference would be that meditation is not preceded by any expectations as in the case of hypnosis (Diekman in Tart, 1969). This can be questioned. Hypnosis can sometimes occur without any earlier expectations from the Ss, and the word

"hypnosis" is never mentioned. On the other hand, expectation as a rule plays' a role in meditation. The study shows that many Ss start to meditate, because of the influence of meditating friends. Introduction lectures and other information beforehand are also likely to cause expectations, influencing the experiences during meditation.

The similarities between meditation and hypnosis seem above all to be manifested in the experiences and the effects created by the state per se. There are also some similarities in the induction methods, while the biggest differences seem to be in the area of application. Self-hypnosis is more goal-directed and brings a larger control over the content of the state and the means to reach the goals. Meditation creates more of free associations and experiences, which are neither steered nor controlled.

Some of the intensive interviews have, however, shown that Ss during self-hypnosis are able to achieve similar experiences. Thoughts and images can emerge in a rather free form between suggestions and the steered imaginations.

A recent pretrial has even illustrated that a person can enter self-hypnosis and then start to meditate or begin to meditate and transfer it to self-hypnosis

IV. Imagination

It is often assumed that concepts such as imagination and involvement play a central role in hypnosis. They are also considered as significant factors in many kinds of psychotherapy, such as imagination therapy, guided affective imagery (GAI), controlled daydream, roleplay, systematic desensitization, covert conditioning and emotive imagery.

Theories, describing hypnosis as a loss of generalized reality-orientation (Shor, 1959), have for instance stressed imagination more than many others. With the loss of generalized reality-orientation, the distinction between reality and imagination fades and modes of primary processes are permitted to flow more easily into awareness. As hypnosis also involves a greater preoccupation with internal sensations or mental processes, vivid imagery, hallucinations and other dreamlike phenomena may be expected to be generated as an integral part of the altered state.

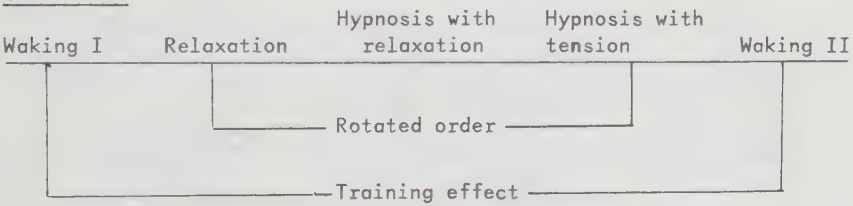
Rather few studies have been made to test the assumption whether there is an actual enrichment of imagery experience in hypnosis. However, those studies made, generally have been supportative. It has been shown that imagery under hypnosis occurs more often (Stross and Shevrin, 1962), is more vivid (Rossi, Sturrock, Solomon 1963) is facilitated (Naruse and Obonai, 1953) and that hypnosis facilitates dream recall (Stross and Shevrin, 1967) and produces more primary process responses on the Rorschach (Fromm, Oberlander, and Gruenewald, 1969). But some other studies have not given so clear differences between the hypnotic and the waking state and generally speaking, the hypothesis that imagery ability is enhanced under hypnosis has not been sufficiently tested.

Some studies have also been concerned with imagination as a predictor of hypnotic susceptibility. These new studies, mostly using Bett's Questionnaire Upon Mental Imagery (Bett's QMI), as devised by Sheehan (1967), have also given somewhat contradictory re-

sults. Shor, Orne and O'Connell (1966) found a significant correlation (r = .56) between vividness of imagery and plateau hypnotizability by clinical diagnostic ratings. Sutcliffe, Perry and Sheehan (1970) found a significant correlation between hypnotic susceptibility and QMI for males but not for females, while Hilgard (1970) found a small but significant correlation between these two measures only for the female sample. Both studies showed a curvelinear relation, vivid imagers were both susceptible and insusceptible to hypnosis, but Ss with very poor imagery tended to be insusceptible.

In order to investigate further the interindividual and intraindividual differences in imagination, a study was designed (Uneståhl, et al., 1972 d). 18 subjects, 6 in each group of the high-, middle- and low-susceptible group, were selected. Besides the Bett's QMI-test two "objective" measurements were chosen, eye-movements looking at a real and imagined pendulum and muscle contractions after real and imagined muscle tensions. Richardson (1969) divides mental imagery in four components: "after-imagery", "eidetic imagery", "memory imagery", and "imagination imagery". We chose two types of "memoryimagery", visual and tachle imaginations.

Conditions



The Ss were divided into three groups according to their results on SHSS-form A.

I.	Low susceptible	0-4 scores on SHSS	6Ss
II.	Middle susceptible	5-9 scores on SHSS	6 Ss
III.	High susceptible	10-12 scores on SHSS	6 Ss

Measurements

Subjective ratings were made of:

a) The reality of the imaginations

b) The degree of relaxation.

c) The depth of hypnosis.

Objective scores were obtained regarding: a) Hypnotic susceptibility (SHSS form A and SPS) b) Imagination measured by EOG and EMG.

RESULTS

The results show a significant (Kruskal-Wallis, $p < 0.05$, Mann-Whitney U-test) increase in imagination under relaxation and hypnosis with and without relaxation for one of the four measurements, the subjective tactile measure.

To confirm the relation between hypnotic susceptibility and imagination, significant testings of group differences were made over all conditions and for each of the four measures. For the low- and middle-susceptible groups, 2 of 20 differences were significant. For the middle- and the high-susceptible group 4 of 20, and for the low- and high-groups 14 of 20. If the four measures on imagination are combined to one imagination score, clear differences can be seen

Table I:3 Relation between susceptibility and imagination.

Group	Low susceptible						Middle susceptible					
Subject no.	1	2	3	4	5	6	7	8	9	10	11	12
Imagination score	11	11	18	19.5	21.5	30	21	30.5	27.5	34.5	20	45.5
Total score	111 p.						179 p.					

Group	High susceptible					
Subject no.	13	14	15	16	17	18
Imagination score	50.5	34.5	40.5	34.5	39	42
Total score	241 p.					

Thus, a linear, not curvelinear, relation can be found if imagination is measured as in this study.

To see if this relation also could be found in the high-susceptible group, the subjects in this group were screened on Stanford Profile Scale of Susceptibility (SPS). No relation or trend was found between the total imagination scores and SPI-scores.

The first and the last condition were the same, waking, in order to investigate possible training effects. No such effects were found. Difficulties in holding the level of concentration and attention at the end of the long experiment could have counteracted possible training effects, the training period could have been too short or imagination could be an ability, not possible to increase by training.

In order to investigate the effect of intensive training during a longer period, a new study was designed (investigation under study, Uneståhl, Lingesjö and Lundberg, 1974.

The purpose was also to see if an extensive training of the imagination would increase the hypnotic susceptibility. Experimental studies attempting to modify hypnotic susceptibility through individual training and practice have not unequivocally supported the belief of hypnotic practitioners, that a hypnotic S can be trained to improve (Shor, Orne and O'Connell, 1966) although successful attempts have been noted (Blum, 1963; Wiseman and Reyher, 1962-63). Cooper, Banford, Schubel and Tart (1967) found a small gain in susceptibility after 10-20 hours' training. The gain was significantly higher for the more susceptible.

Method - 18 Ss, divided in 1 control group and 2 experiment groups, were tested on SHSS-form A and Bett's QMI-test. The 12 Ss in the two experiment groups went through a 6 week's program in imagination training, constructed by the experimenters. The program compassed homework with training of all senses and regular laboratory sessions with training of relaxation, the homework, a standard story,

a previous experience, a personal problem. The program was the same for the experiment group I and II with one important exception, the experiment group I also trained with the items on SHSS-form B (parallel test to form A).

The most important results can be seen in Table I:4.

Table I:4 Results on Bett's QMI-test before and after training (Medians). $p < 0.05$

	Controlgroup	Experimentgroup I	Experimentgroup II
Before training	124.0	123.0	98.5
After training	117.5	89.0	92.0

Higher scores = lower ability of imagination

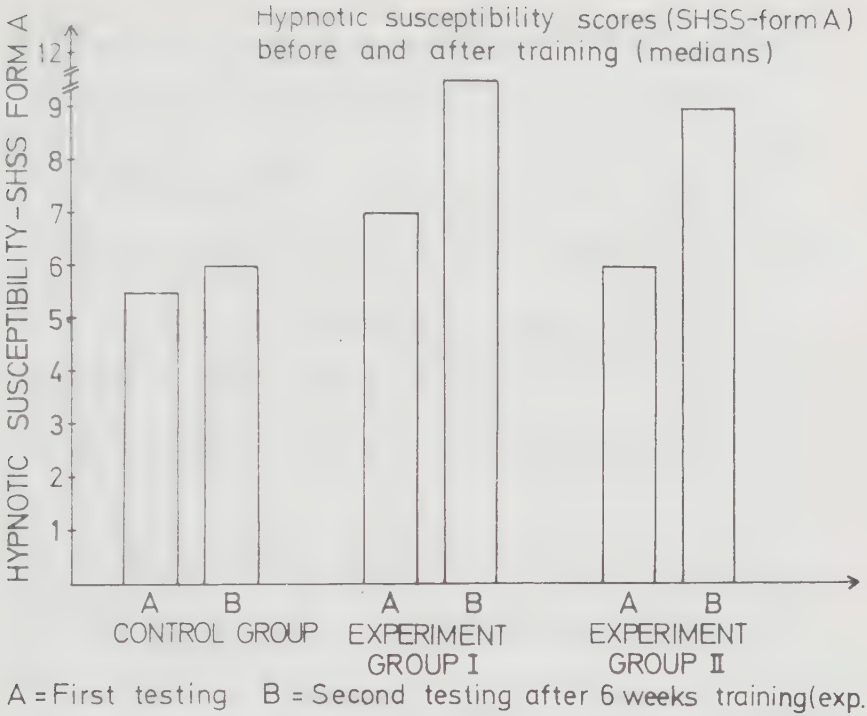
The two experimentgroups had a significant change in the direction of higher imagination, measured with Bett's QMI-test (Wilcoxon, Mann Whitney). The ability of all the senses is measured by the test and the training also compassed all the senses. The significant change of the test results is, however, due to above all one of the senses, the sight.

Table I:5 Results on SHSS-form A before and after training (Medians)

	Controlgroup	Experimentgroup I	Experimentgroup II
Before training	5.5	7.0	6.0
After training	6.0	9.5	9.0

A significant increase (Mann-Whitney, Kolmogorov - Smirnoff) in the hypnotic susceptibility, measured with SHSS-form A, can be seen for both experimentgroups, compared with the controlgroup. The increase in the two experimentgroups is about the same, which indicates that it is not the special training of "hypnotic items" (form B) which is important but the general training of imagination. If the Ss in the experiment groups are divided into one low and one

Figure I:1



high susceptibility group, the high group increase the scores from 9.5 to 11.5 and the low from 4.5 to 7.5. Thus, it seems to be an increase, independent of the pre-training susceptibility, and even a tendency of higher gain among the less susceptibility, a finding that oppose the study of Cooper et al.

The increase of hypnotic susceptibility by intensive training of imagination is very promising, indeed, thinking of the poor success of earlier procedures, aimed to improve the susceptibility to hypnosis.

CRITERIA FOR THE HYPNOTIC STATE

An analysis of the hypnotic state ought to include four important questions.

1. What spontaneous changes aries from the hypnotic state per se?
2. Which of these changes are necessary for the hypnotic trance?
3. Which changes can be brought about with the help of explicit and implicit, hypnotic and posthypnotic suggestions?
4. Which of these changes are of such a character, that they are not received or just to a smaller degree received in the awake state?

The first two questions concern the attempts to identify an independent criterium on hypnosis. Many have been looking for criteria in the physiological area.

Physiological criteria

That physiological changes can appear during and after hypnosis have been shown in many experimental and clinical studies. The experiments have been of two kinds, those which register changes in connection with the induction itself and those which measure physiological reactions to suggestions given after the induction.

A lot of investigations with conflicting results, have been made regarding the effect of the hypnotic induction on physiological measures.

Respiratory changes by hypnotic induction, similar to sleep onset, have been reported. Doust (1953) has shown that the level of arterial oxygen saturation is a function of trance depth: anoxaemia increases as trance deepens. Black and Pugh (1964) measured the alveolar ventilation at different concentrations of carbon dioxide in the inspired air - and the effects of hypnosis on breath holding.

Breathing five per cent carbondioxide, deeptrance subjects, when hypnotized, showed a drop of 33 per cent in the alveolar ventilation.

Sarbin (in Fromm-Shor, 1972) claims that the pulse is somewhat accelerated during the induction. Milechning (1967) report different investigations, where the pulse and bloodpressure either increased, decreased or remained unchanged. The differences in results might be due to different ways of giving and taking an induction, expectations, familiarity with the situation, hypnotizability, etc.

Uneståhl (1968 c) measured some autonome variables during hypnosis and posthypnosis (chapter VIII). Table I: 6 shows the mean values (7 Ss) during the hypnotic induction and the programming of the posthypnotic suggestions (PHS).

Table I: 6 Some autonomic measures in waking rest and hypnosis (Means)

	Respiration	Pulse	SRL	SRR
Waking - rest	17.5	79.7	50	2.9
Hypnosis: Relaxation	16.1	80.6	54	1.9
Hypnosis: PHS	18.7	81.6	58	3.9

The differences are not significant and the means do not cover a similar trend over all Ss. A comparison between for instance, waking - rest and phase I - hypnosis (relaxation) shows that 5 decrease and 2 increase the rate of respiration, 4 decrease and 3 raise in pulse, etc. This variations in reactions can perhaps explain the difference in results, regarding the effect of induction, obtained in different studies.

The values of the physiological measurements during hypnosis are to a large extent depending on if and what kind of suggestions have been given. In the experiment with cardriving in a simulator (chapter VIII), physiological measurements were made during the hyp-

notic induction, the programming of the PHS, and the cardriving in hypnosis and waking (table I:7)

Table I:7 Autonomic measures in waking and different stages of hypnosis.

		Respiration	Pulse	SRL	SRR
HYPNOSIS	Induction	12.5	84.3	48.4	2.0
	Programming of PHS	14.5	86.4	50.5	4.3
	Cardriving	19.7	87.9	45.6	11.0
Waking	Cardriving (Means of waking cond.)	19.9	87.1	48.2	7.3

Thus, the physiological values, obtained under hypnosis, seem to be related to the activity. Already when the PHS are given, some of the changes from the induction disappear, and when the Ss are asked to open their eyes, and drive, the measures are very similar those received during driving in waking.

Ravitz (1950, 1951 a,b) and O'Connell and Orne (1962) found a reduction in spontaneous electrodermal activity during hypnosis as compared to the waking state. Tart (1963) found a high positive correlation between the basal level of skin resistance (SRL) and depth of hypnosis on a self-report depth scale. The changes in electrodermal measures might however, be an effect of some component in the hypnotic induction, for instance, relaxation, a common but not necessary component in the induction.

In the searching after some independent physiological criterium on hypnosis, recordings have been made of bioelectric, cardiovascular, respiratory, vasomotor, genitourinary, gastrointestinal, endocrine and metabolic functions. In spite of clear and significant changes on all these functions as a result of hypnotic and post-hypnotic suggestions, one has not been able to relate a single change on any function to the hypnotic state per se.

All physiological measures have, however, not been tested and in a preliminary study, Uneståhl et al. (1974 b), made on an investigation of two such measures, nystagmus and pupilsize. Nystagmus was recorded with the EKG-apparatus in a balance laboratory and the pupil changes were filmed with a video-tape equipment. The Ss were trained to enter hypnosis quickly, and they could also open their eyes without disturbing the hypnotic trance. The results were that no changes occurred, which could be related to hypnosis per se, neither on the nystagmus or the size of the pupil.

Thus, no physiological measure that could serve as an independent criterium on hypnosis has yet been found.

Phenomenological and behavioral criteria

Subsidence of the planning function - According to Hilgard (1965) the hypnotized subject loses initiative and lack the desire to make and carry out plans of his own. This may be valid for heterohypnosis but the person, trained in self-hypnosis, does not only learn to handle the induction but also to take and realize initiatives during hypnosis.

Trance logic - Orne coined the expression "trance logic" for the kind of thinking and logic, common in deep hypnosis, which implies an increased tolerance for reality distortion. Primary process thinking increases with the reduction of reality testing. At age regression to nine years one of my subjects could answer my questions only in Finnish as she did not speak Swedish at that age. However, in order to answer, she had to understand the questions. Orne told (1973, personal communication) about one intelligent subject, seeing two copies of the same person in the double hallucination test, who was asked which of the two persons was the real one. He succeeded in finding the real one by deciding for himself that the two persons should raise their hands. The hallucinated copy

raised his hand, the real one did not. Thus, a hypnotized person can mix these primary processes with very complex secondary processes. If trance logic is a necessary component in deep hypnosis or if it can be reduced or eliminated by appropriate suggestions has not yet been shown.

Rapport - Analytic theories of hypnosis regard the essence of hypnosis to be in the increased rapport between the hypnotist and the subject. This can hardly, however, be regarded as a necessary component as self-hypnosis is as real a phenomenon as hetero-hypnosis (chapter X).

Perceptual changes - One spontaneous phenomenon which can be tested in deep-trance subjects, keeping their eyes open, is tunnel vision. Recordings of the visual field constriction can be done with a perimeter (Black, 1968). Graham (1973) found that highly susceptible Ss showed a significant decrease of peripheric visual perception compared with low-susceptible in the same situation. This occurred even after an induction, emphasizing a greater effectiveness to detect visual stimuli.

Amnesia - There are different types like recall or source amnesia (Evans, 1929), sensory amnesia and amnesia of integration (Wright, 1966). Amnesia can be total or partial, suggested or spontaneous. Rather few per cent have spontaneous amnesia and this phenomenon is never necessary, it can always be abolished with suggestions.

Time distortion - Altered states of consciousness seem to be accompanied by an altering of the time and chronology. The subject can experience an acceleration or a slowing of time or even fellings of timelessness.

After being tested with SHSS-form A (chapter II) the Ss were asked to estimate the duration of the test (Uneståhl, 1968 a). 20 of 22 Ss underestimated the time and the underestimation was increased with higher susceptibility to hypnosis. The correlation between the

hypnotizability and the underestimation was 0.47 (sign. 1%). This time distortion seems to be spontaneous but can be changed by suggestions. Cooper and Erickson (1954), in their pioneer work on time distortion, have manifested the possibility of experiencing mental activities, normally taking hours, in some few seconds. Erickson's experiments with Aldous Huxley also demonstrated that a considerable mental activity was possible in an objectively very short time. The experiments with changing the subjective time experience in different directions show, that even if the underestimation of time is a common denominator of the hypnotic trance it is not at all necessary.

Even the time distortion in itself as a criterion can be doubted. In one of the studies of self-hypnosis (SH) (chapter IX) the Ss were asked to estimate the trance-duration after every SH-session. 10 Ss did this estimation on total 279 occasions. They underestimated the time 144 times (51%), overestimated it 97 times (34%) and rated almost exactly 38 times (15%). The mean difference between rated and real time was 4.9 minutes over all Ss and all occasions. Thus, the time distortion seems to be smaller and more distributed on both sides of the objective time in SH compared with HH.

In the same study, the Ss were given the task of deciding the number of minutes they wanted to stay in SH on 5 different occasions before entering SH. The deviations from the pre-decided time can be seen in table I:8 and I:9

Table I:8 Mean deviation (15 Ss) objective trance duration - predecided duration

Occasion	1	2	3	4	5
Deviation in min.	3,9	3.6	5.0	2.2	3.3

Table I:9 Mean deviation objective trance duration - predecided duration

Predecided duration	5	10	15	20	25	30
Deviation in min.	2.2	2.9	2.7	4.0	1.3	8.5

Some of the Ss described that the predecided time functioned like a signal, which after a certain time made the Ss aware of the time or which spontaneously awaked the Ss.

Increased suggestibility - Suggestions have played a major role in hypnosis from the right beginning and many investigations like Hull (1933) have looked upon hypnosis above all as a state of increased suggestibility. Most of the scales, measuring hypnotic susceptibility, are also concentrating on this hypnotic feature, as it is rather easy to measure. Suggestions are used very frequently in the methods of induction, leading to the hypnotic state, but the state in itself is supposed to increase the suggestibility further. There might, however, be proposed four limitations in the increased suggestibility as an spontaneous consequence of hypnosis.

1. The variations in degree of hypnotic suggestibility are not in full accordance with the pre-hypnotic suggestibility.
2. There exist variations in hypnotic suggestibility, regarding types of suggestions.
3. No apparent positive correlation seems to exist between experienced hypnotic depth and hypnotic suggestibility. Recent experiments (p. 17) even indicate that the suggestibility may decrease at larger depths.
4. A person can be selective suggestible regarding the source of suggestions. The studies in self-hypnosis (chapter IX) showed that the Ss were not spontaneously blocked for suggestions from being receptive for heterosuggestions.

Conclusions - Some of the most common characteristica on hypnosis have been discussed. They are all spontaneous changes, i.e. they are not deliberately induced by means of suggestions. The question if they are necessary elements is more difficult to answer. Most of the proposed characteristica of the hypnotic state can undoubtedly be reduced or eliminated without causing the Ss to leave hypnosis. Some other like trance logic, tunnel vision or the increased suggestibility can be influenced by suggestions but eliminating them will probably cause either a terminating of hypnosis or a change to another form of altered state of consciousness.

Gill and Brenman (1959) asked the Ss about which differences they experienced between hypnosis and the waking state. For every described difference the E gave a suggestion that this difference was going to disappear and that the Ss should feel exactly like in waking in this respect. At the end they found that the only remaining difference was that the Ss had still an increased suggestibility.

However, there are also qualitative experiences, which are difficult to measure and sometimes even difficult for the Ss to describe. Orne (1959) has stated: "Any subject who has experienced deep trance will unhesitatingly describe this state as basically different from his normal one. He may be unable to explicate this difference, but he will invariably be quite definite and certain about its preference."

Another phenomenon, not taken up by Gill and Brenman but which Graham (1973) did not succeed in abolishing, is tunnel vision, which I like to see as a part of the more general concept of "restricted attention".

Thus, in light of the preceding discussion, I want to construct the following definition: "HYPNOSIS IS A STATE WITH VARIOUS SUBJECTIVE QUALITATIVE CHANGES, CHARACTERIZED BY A RESTRICTED ATTENTION AND AN INCREASED PREPAREDNESS TO RESPOND TO SUGGESTIONS AND IMAGINATIONS."

The last two questions concerned the effects of and the possibilities with this increased suggestibility. Hundreds of hypnotic phenomena, more or less dramatic, are reported as a result of explicit and implicit suggestions. During the last decade many investigations have tried to find out which of these pheomena are of such a character that they are not obtained at all or just to a smaller degree in the awaking state. The experimental design, proposed and used by Martin Orne, where he supplements the control group with simulating groups, has played an important role.With such an approach it has been possible to show clear differences in many areas between hypnotized and simulating subjects.

SUMMARY

1. An altered state of consciousness (ASC) can be defined as any mental state representing a sufficient qualitative deviation in subjective experience or psychological functioning.
2. In spite of hypnotic phenomena, being known and described for thousands of years, hypnotic research and theorizing are just a few decades old.
3. The empirical support for physiological theories is weaker than for other more psycholcgical theories.
4. Predessors can be found for all the alternatives if state-theories are combined with trait-theories.
5. For the low susceptible Ss hypnosis does not seem to add anything to their slight effect of relaxation training and for the high susceptible Ss a formal hypnotic induction does not either add much to their strong "hypnotic" effect of the relaxation training alone.
6. Relaxation is a common and sometimes the only element in hypnotic induction procedures and is mostly also a characteristic feature

of the hypnotic state, but relaxation is neither a necessary element in the induction methods nor in the hypnotic state.

7. Even if hypnosis and sleep are two different phenomena, there are many interactions possible between them.
8. Due to the similarities between hypnosis and meditation it is possible to switch the one over into the other and vice versa.
9. Intensive and long training of imagination increased not only the imagination ability but also the hypnotic susceptibility.
10. Recordings of nystagmus and pupil-size did not manifest any changes, which could be related to hypnosis per se.
11. No physiological measure that could serve as an independent criterion on hypnosis has yet been found.
12. Many changes during hypnosis can be ascribed to explicit and implicit suggestions, and not the hypnotic state per se.
13. Many of the spontaneous changes, due to hypnosis per se, can be diminished or abolished with the help of suggestions.
14. A significant correlation (0.47) between hypnotic susceptibility and the degree of underestimation of time has been found in hetero-hypnosis but the distortion is smaller in self-hypnosis and it can be steered in both directions by suggestions.
15. After discussions about necessary criteria for hypnosis I define hypnosis thus:

"HYPNOSIS IS A STATE WITH VARIOUS SUBJECTIVE QUALITATIVE CHANGES, CHARACTERIZED BY A RESTRICTED ATTENTION AND AN INCREASED PREPAREDNESS TO RESPOND TO SUGGESTIONS AND IMAGINATIONS."

CHAPTER II. HYPNOTIC SUSCEPTIBILITY

There is little doubt that there are great differences between individuals with respect to their susceptibility to hypnosis. There are however various opinions regarding the explanation to these differences. According to some clinicians they may be due to deficiencies in the methods of induction. By using a method, adopted to the conscious and unconscious need in a person, everyone would be able to be hypnotized. Barber (1964) relates the differences mainly to situations- and motivations-factors, while Hilgard et al. (1965) regard the susceptibility as a rather stable personality-trait. A common view is relating hypnotizability to two background variables, one is the basic ability and the other is a more modifiable attitude component.

A number of scales have been developed for assessing the susceptibility. As psychometric instruments, these scales ordinarily involve a standard induction, so that susceptibility is measured as a "work sample" of hypnotic - like performances following this standard induction. There are also scales with substitutes for the standard induction, like relaxation, imagination or task motivation. Such scales, with normative data, are of great importance in specifying the nature of subjects used in hypnotic experiments or as criteria when correlates of hypnotic susceptibility are under investigation.

The recent scales are mostly modifications and elaborations of an earlier scale by Friedlander and Sarbin. The basic scale, known as Form A of the Stanford Hypnotic Susceptibility Scale (SHSS), translated to Swedish by Uneståhl, is intended for general screening purposes. The scale somewhat overstresses motor effects but its scores correlate satisfactorily with other scales sampling a wider range of phenomena. Form A has then served as the basis for the construction of a groupscale (HGS) and a scale for children (CHSS). A profile scale (SPS) has also been constructed with the intention to playup the specific factors associated with individual differences in hypnotic susceptibility.

The structure of hypnotic abilities has been studied by factor analysis. Early studies by Eysenck (1943) and Eysenck & Furneaux (1945) distinguished between "primary suggestibility", a common factor in most hypnotic susceptibility scales and "secondary

suggestibility". This distinction has been supported by Stukat (1958) and Duke (1964). Tests of "gullibility", including tests of social suggestibility have yielded insignificant relationships to hypnotic susceptibility. A factor analytical study, made by Evans (1967), does not, however, confirm the traditional distinction between primary and secondary suggestibility. Instead he introduces three kinds of suggestibility, primary (motor), challenge and imagery (sensory), which he relates to aspects of classic, verbal and sensory conditioning.

Correlates of susceptibility

Because tests of hypnotic ability are essentially work-samples of what the subject can do either under hypnosis or in a hypnotic-like state, these scores serve as criteria to be related to other types of measurement, or to other parameters, outside the hypnotic situation. Some of these relationships will be related.

a. Age. - A classic study of Liebeault (1889) found children to be more susceptible than grown ups, the most susceptible ages between 7 and 14 years. Some of the more recent studies have confirmed this result. While Moore & Lauer (1963) found unclear age trends, London (1963) found maximum hypnotizability among children at ages 9 - 14, reducing to adult levels at 15 - 16. Barber & Calverley (1963), while not using a formal induction, found highest hypnotic-like susceptibility between the ages 8 - 10, levelling off to adult levels at ages 14 - 15. Also qualitative differences have been found with the children managing items like amnesia better than motoric items. In a still unpublished study, Arlene Morgan, has shown a rather pronounced drop in susceptibility between 16 and 20 and a tendency for a gradual decline thereafter through later middle age. An investigation by Berg & Melin (1973) of 44 Ss in ages 67 - 94 (M=81,5) gave an average score of 3,11 with a bimodal distribution with peaks at 2 and 9. The men were significantly more susceptible than the women.

b. Sex. - Studies of large samples of students show no sex differences in scores on standardized scales and these findings seem to hold regardless of the sex of the hypnotist.

c. Clinical groups. - Despite the many years that hypnosis has been used in psychotherapy, little is known about the relative hypnotizability of patients fitting the various diagnostic patterns. Charcot's proposed relation between hypnotizability and hysteria has been found to be wrong (Eysenck et. al.), the opinion that neurotics are less hypnotizable than normals (Gill & Brenman 1959) has been doubted (Hilgard 1965) and the belief that schizophrenics are rather refractory to hypnosis has been opposed in studies, showing that in fact substantial numbers of psychotic patients are highly susceptible (Gale & Herman 1956, Heath & Hoaken 1960, Kramer & Brenman 1964, Biddle 1967). The assumption that slight positive relationship to intelligence exists, but many mentally deficient individuals have also been found to be susceptible, according to Sternlicht & Wanderer (1963).

d. Personality factors. - An extensive work has been made to investigate the relationships between susceptibility and personality factors, measured by various tests. All correlations until now have, however, been low and disputable, the positive results reported in one investigation have been almost immediately denied by the next investigator who attempted to replicate them.

e. Experiences. - A slightly more promising lead than the personality studies is the construction of inventories measuring hypnotic-like experiences in everyday life and the attempts to relate these to experiences within hypnosis. The method, introduced by Shor (1960) has consistently yielded small but significant correlations with hypnotic susceptibility in the studies by Ås (1963), Lee (1963), Evans & Thorn (1964) etc. Lee has pointed out that the interpretation is made somewhat uncertain because of the prominence of the acquiescence tendency important in the responses to such inventories.

f. Motivation. - A common view is that hypnotic susceptibility has both an ability- and an attitude - component i.e. a basic ability is needed but factors like motivation and expectation can modify the result. Therefore it is not surprising that voluntary subjects tend to get higher scores than non-voluntary. Hilgard and Melei (1965) obtained significant correlations between susceptibility and attitude to hypnosis but only for the female.

g. Self-predictions. - Self-predictions of subjects inexperienced in hypnosis had rather small but significant correlations with the results following induction (Hilgard 1965). As the subjects probably estimate on the basis of previous hypnotic-like experiences but also upon their eagerness to have the hypnotic experience, there is also a positive, but rather small, correlation between attitude and self-predictions. Self-estimations of depth, made during hypnosis, were found by Evans and Orne (1965) to have a significant correlation with objective scores, while Field (1966) found much smaller correlations. The highest correlations (0,81) have been found between posthypnotic estimations of susceptibility and the objective scores.

h. Development. - Interesting aspects of hypnotic susceptibility are given by Hilgard & Hilgard (1965, 1970) in their developmental-interactive theory, based on intensive interviews with several hundreds of subjects. Some of their developmental propositions can be mentioned:

D-1 "All normal infants are born with the potential to develop the ability for profound hypnotic experiences."

D-2 "The ability of a child to disengage himself from reality-orientation and to become deeply involved in fantasy or adventure may be preserved if sufficient experiences of this kind are encouraged in childhood."

D-5 "Parental influences and identifications are very important in preserving, extending or reducing and destroying hypnotic susceptibility."

Among the interactive propositions can be mentioned:

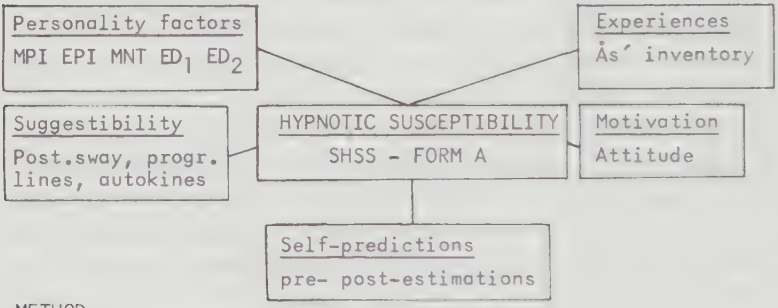
I-6 "There are multiple paths into hypnosis that can be activated through induction; if anyone of these exists in sufficient strength as a substructure (or habit system) within the personality, induction may communicate with it and thus lead to the hypnotic state."

The matter of multiple paths into hypnosis makes it very difficult to predict hypnotic susceptibility, as the usual type of additive scoring of testpoints and other predictive indicators will fail presupposing that the paths are actually alternative paths. Thus measurements will have to employ some sort of moderating variable before obtained correlations will account for an appreciable amount of the variance of hypnotic susceptibility.

HYPNOTIC SUSCEPTIBILITY (Uneståhl 1968a, Uneståhl et al. 1967b, 1968d).

Two studies were made to relate hypnotic susceptibility to the factors mentioned in figure 2:1. The correlations with and between 26 different variables were measured. 202 subjects participated in all, of these 63 in the two experiments.

Figure 2:1 Correlates of susceptibility



METHOD

39 Ss, students, 10 male and 29 female, took part in the first experiment. The following personality factors and experiences were measured.

1. MNT - Marke-Nyman´s temperament scale ("validitet", "stabilitet" and "soliditet").
2. MPI - Maudsley Personality Inventory (Extroversion, Neuroticism).
3. ED_1 - Dureman (Egodistance, Habit boundness).
4. ED_2 - Dureman (Rigidity)
5. Ås - inventory (hypnotic-like experiences in every-day life).

The second experiment comprised 25 variables, which can be seen in the correlation matrix, table 2:2. Besides the same personality factors as in experiment I the study measured suggestibility of different kinds, motivation, attitude to, interest for and knowledge about hypnosis, pre- and post-estimations of hypnotic susceptibility and post-estimations of time-duration in hypnosis.

A special questionnaire was constructed and administrated to 163 persons. On the basis of the results in two variables, wanted and predicted susceptibility, 24 subjects were selected. The results made 4 extreme groups impossible, so 6 were taken from low-

low and 6 from high-high and the rest from middle-high, high-middle and middle-middle. These 24 subjects were also selected so that they covered the whole distribution on a third variable, the motivation to be hypnotized.

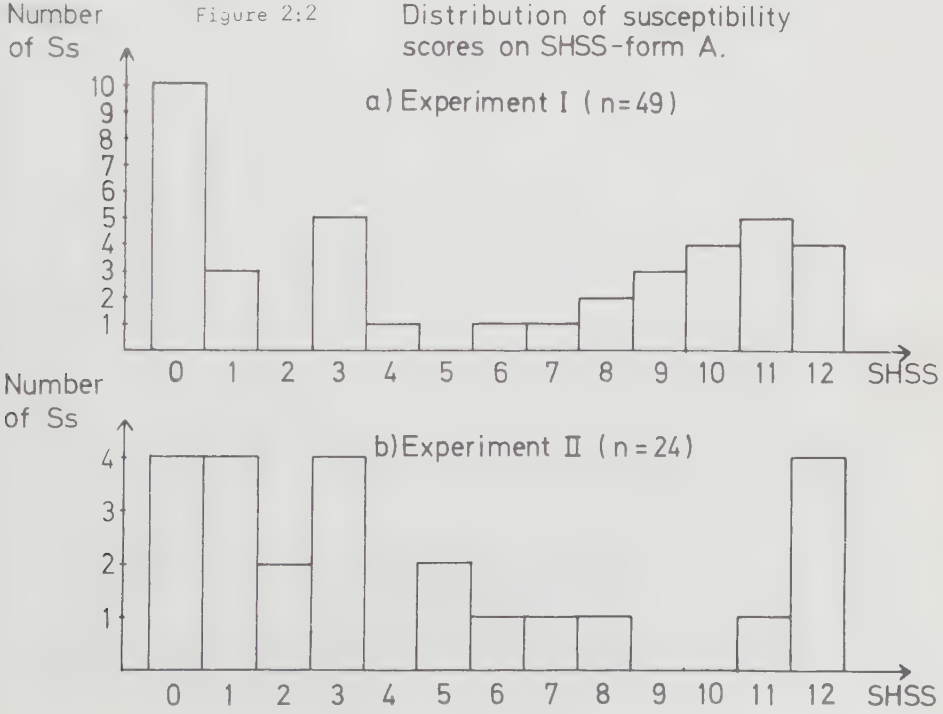
Besides the differences in the investigated variables and subject selection there was also a third difference between the two experiments. The induction and the test-instructions were in the first experiment made by the experimenter in person but in the second experiment by a taped version.

The data were treated by a program system for elementary statistical analysis (ELSA).

RESULTS

A bimodal score-distribution was obtained in both studies. The mean is somewhat higher in the first experiment but the difference is not significant. (figure 2:2)

Figure 2:2 Distribution of susceptibility scores on SHSS-form A.



The relations between the various variables can be seen in two correlation matrixes, table 2:1 (exp. I) and table 2:2 (exp. II).

Table 2:1 Correlation matrix, experiment I.

	1	2	3	4	5	6	7	8	9	10
1. SHSS-form A										
2. "Validitet"	.21									
3. "Stabilitet"	.26	-.18								
4. "Soliditet"	-.31	-.22	.25							
5. Extroversion	.14	.59	-.55	-.51						
6. Neuroticism	.21	-.62	.15	-.24	-.33					
7. Ås-inventory	.23	.17	-.45	-.44	.40	.08				
8. Egodistance	.16	.13	.12	-.52	.16	.15	.21			
9. Habit boundness	-.38	-.27	-.09	.49	-.26	-.11	-.30	-.50		
10. Rigidity	-.39	-.30	-.04	.27	-.16	.25	-.20	-.14	.22	

DISCUSSION

In experiment I psychology students were from one of the courses, and since all participation was compulsory, the representativity is probably better compared with that of voluntary subjects.

The collation in table 2:1 shows two significant, negative correlations viz. between habit boundness, rigidity and the criteria. The correlations are not high, but taking into account the lack of persistent significances in previous studies, these correlations must be regarded as very interesting. The habit boundness, rigidity and "soliditet" form a triad with negative correlations with SHSS and with high intercorrelations.

The median-values for the high and low group in SHSS-scores differ in the various test-factors. Still more obvious are the differences in distribution. The high-score group has an wider distribution in all factors but one. Thus it seems as if the more hypnotizable subjects have a more differentiated picture of themselves.

In experiment II there were no significant correlations between SHSS and any personality factor, as can be seen in table 2:2. If the scores from the two experiments are combined the result will be that the relation between SHSS and "soliditet" disappears, the sig-

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. SHSS-form A																								
2. Progressive lines	.22																							
3. Autokines-latency time	-.38	.07																						
4. Autokines-movement period	-.06	.30	-.51																					
5. Autokines-end result	.64	.04	-.58	.25																				
6. Autokines-distance point	.23	-.05	-.31	.07	.51																			
7. EPI-liescore	.11	.17	-.02	.09	.13	.27																		
8. EPI-extroversion	-.31	-.48	.11	-.08	-.35	-.21	-.07																	
9. EPI-neuroticism	.05	-.02	.17	-.13	-.05	-.13	-.42	-.29																
10. MNT-"validitet"	-.22	.12	-.06	-.06	-.32	-.11	.25	.48	-.63															
11. MNT-"stabilitet"	-.06	.47	.57	-.13	-.39	-.24	.10	-.43	.18	-.17														
12. MNT-"soliditet"	.32	.38	.20	-.25	.23	.08	.43	-.63	.08	-.25	.51													
13. ED_1-egodistance	-.30	.13	.13	.14	-.45	-.19	-.34	-.04	.34	.03	.20	-.40												
14. ED_1-habit boundness	.00	.17	.08	-.21	.15	.19	.42	-.38	-.10	-.25	.23	.67	-.45											
15. ED_2-rigidity	-.15	-.05	.01	-.03	.04	.00	-.09	-.00	-.10	-.25	.13	.27	-.29	.55										
16. Ås inventory	.06	-.33	-.19	.03	-.03	-.27	-.39	.55	.19	-.07	-.54	-.66	.03	-.53	-.10									
17. Previous experience of hypnosis	.32	-.17	-.15	-.22	.16	.52	-.13	.17	.12	.03	-.27	-.19	-.03	-.27	-.09	.27								
18. Knowledge about hypnosis	.17	-.06	.03	-.07	-.27	-.21	.00	.35	.01	.19	-.06	-.33	.14	-.31	.16	.44	.08							
19. Wanted susceptibility	.64	.17	-.30	.23	.20	.09	.08	-.16	.09	-.18	-.05	-.10	.06	-.25	-.41	.21	.15	-.09						
20. Attitude to hypnosis	.33	.26	-.17	.08	.24	.18	-.23	-.31	.19	-.12	-.12	-.14	.13	-.18	-.19	.17	.18	.10	.36					
21. Theoretical interest for hypnosis	.34	.17	.14	-.05	.17	.08	.00	.10	.31	-.19	.00	.01	.08	-.18	-.10	.18	.14	.08	.37	.15				
22. Wish to be hypnotized	.54	.14	-.11	-.12	.14	-.13	-.38	.04	.13	.00	-.12	-.27	.28	-.46	-.31	.38	.22	-.02	.59	.56	.34			
23. Interest for hypnosis	.56	.18	-.01	-.11	.19	-.06	-.28	.07	.25	-.09	-.08	-.19	.24	-.42	-.27	.36	.23	.02	.61	.48	.73	.89		
24. Selfpredicted susceptibility	.62	.31	-.13	-.19	.33	.14	-.22	-.56	-.35	.35	.09	.17	.15	-.03	-.25	.01	.12	-.16	.48	.71	.33	.64	.62	
25. Post estimation of susceptibility	.84	.28	-.57	.25	.58	.15	.14	-.34	.06	-.12	-.11	.27	-.22	-.09	-.16	.04	.14	-.06	.68	.24	.30	.44	.46	.44

nificant correlation between SHSS and habit boundness decreases and is not significant any more. On the other hand there is still a significant negative correlation between SHSS and rigidity. The relations to experiences, measured by the Ås-inventory were small in both experiments and not significant.

Of the suggestibility factors the four autokinetic variables showed a strong and significant relation with SHSS. This test measures what Eysenck calls primary suggestibility, while the progressive lines, measuring secondary suggestibility had a lower and non significant relation to SHSS.

There were also some strong correlations among the motivations- and attitude-variables and also between SHSS and the self-prediction scores. To test Hilgard´s hypothesis that the subjects, inexperienced in hypnosis, estimate on the basis of hypnotic-like experiences outside hypnosis or upon his eagerness to have the hypnotic experience, the subjects in this investigation had to motivate their estimations. Half of the Ss based their estimations on previous experiences, while 4 Ss based the ratings only after eagerness to participate. The post-estimation of the susceptibility had the highest score of all (0,84) in spite of the fact that many Ss reacted to the question telling that they could not know what was average.

The induction and testing of hypnosis were administered through a hypnotist in the first experiment and a tape recorder in the second. The advantage with a mechanical administration is that the subject does not have to be bothered by an observing hypnotist, and that he can better tune out a disturbing surrounding with the help of earphones. It also facilitates the work for the experimenter and makes the entire experimental situation more standardized. A common claim has, however, been that it is necessary with a personal contact between the hypnotist and the subject for a successful result. A comparison between the two experiments shows that the SHSS-scores are distributed in a similar bimodal curve. The group mean in experiment I (personal contact) is certainly somewhat higher but the difference is not significant.

As the influence of motivational factors on susceptibility was going to be investigated the study tried to avoid voluntary participation as much as possible. In experiment I a group of psychology

students were chosen, who had to spend a certain number of hours as Ss in experiments. In experiment II the motivation was varied systematically by picking out Ss with different motivation, self-prediction scores and wanted susceptibility. Most Ss, trying hypnosis for the first time, play a waiting game and are often somewhat tense and cautious. For that reason the high correlation between SHSS and motivation will probably decrease, if measured when the Ss have become more acquainted with hypnosis.

The negative correlation SHSS - rigidity, persistent through both experiments, is interesting partly because of the earlier lack of persistent relations and partly because it is the first time that this variable is investigated in this connection.

Most researchers agree that the hypnotic state in several ways differs from the waking state. One of the criteria is the increased suggestibility. The standardized scales, measuring hypnotic susceptibility, are mainly based on this indicator; scores = number of effective suggestions. The changes in experiences of more qualitative nature are not estimated in these scales. The post-estimated susceptibility, having the highest relation with SHSS-scores, is however probably partly based on these qualitative experiences.

One problem with picking susceptible Ss for experiments has been the lack of any predictable indicator for hypnotic susceptibility. Extensive testing has to be done before a sample of highly susceptible Ss has been obtained. According to the results in this investigation some meaningful screening is possible in advance. By constructing a very simple rating sheet with the three variables; eagerness to be hypnotized, self-predicted susceptibility and wanted susceptibility, all having correlations with SHSS about 0,60, the selection of Ss can be made with large certaint from the beginning. The fastest way is to choose one question for every variable as follows:

1. To what extent are you interested in getting the opportunity to be hypnotized?

Not at all		Somewhat		Rather		Very		Very much
1	2	3	4	5	6	7	8	9

2. How susceptible for hypnosis do you think you are?

Not at all		Somewhat		Average		Very		Very much
1	2	3	4	5	6	7	8	9

3. If you were to choose, how susceptible would you want to be?

Not at all		Somewhat		Average		Very		Very much
1	2	3	4	5	6	7	8	9

The scale takes only half a minute to administer. By choosing individuals with a total score over 20 the chance to get susceptible Ss is considerably increased.

One of the disadvantages with the existing susceptibility scales is the long test time, for SHSS-form A about 45 minutes, for some other over one hour. A much faster and still fairly reliable measure on susceptibility, at least for clinical purpose, could be done with an induction, containing only some single motoric item, for instance arm levitation. The subject then makes a post-estimation of the susceptibility and a time-estimation. A fairly good measure of the susceptibility is then obtained by a combination of:

a. Observations of the subject's behavior during the induction.
b. The effect of the induced motor item.
c. The post-estimation of susceptibility.
d. The time-estimation.

THE EFFECT OF EXPECTATION ON HYPNOTIC SUSCEPTIBILITY
(Uneståhl et al. 1972 h.)

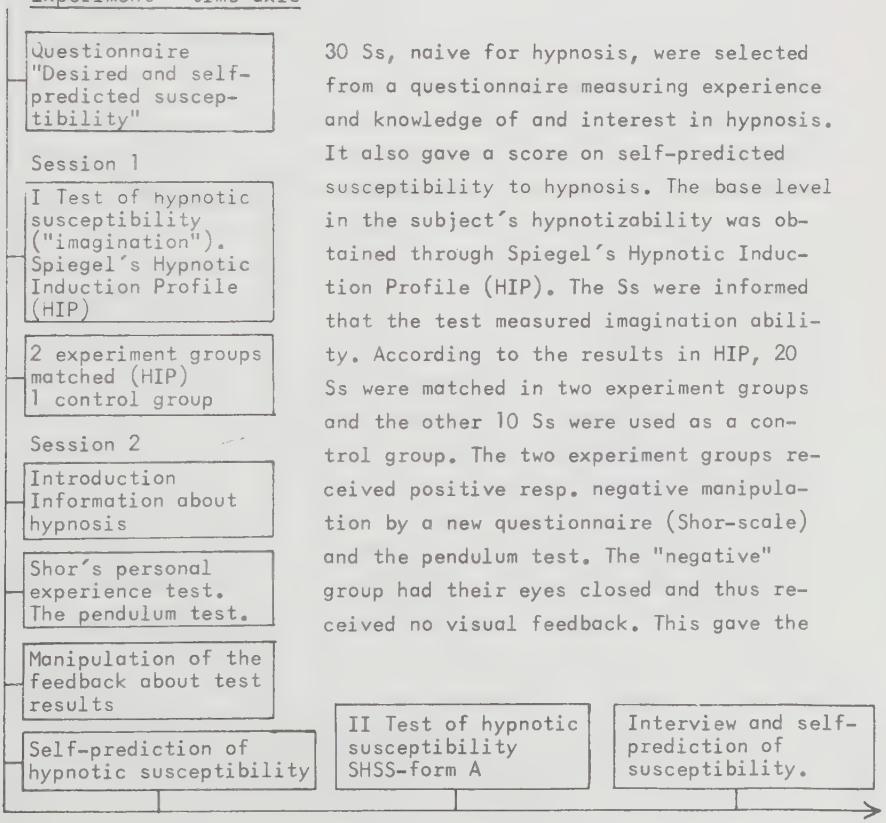
Most researchers agree on the two suggested and above mentioned underlying variables in hypnotizability, a basic ability and a more modifiable attitude-component. There are however important differences in stressing the first or the second factor. Researchers like Barber are of the opinion that external factors like attitude, motivation and expectation are sufficiently conclusive for the susceptibility, while Hilgard et al. stress the individual factors.

In the former two experiments motivation and expectation were measured but in this third experiment the purpose was to manipulate the self-predicted susceptibility, and to measure the effect of this manipulation.

Orne has introduced the concept "demand characteristics" and in his classic e periment (1959) he managed to get spontaneous catalepsy under hypnosis in the dominant hand in 5 of 9 Ss who had been earlier convinced that this phenomenon was a characteristic of hypnosis.

Brown and Krasner (1969) investigated the effect on the hypnotizability of the subjects' expectation and "early date return". Rosenthal et al. (1967) had earlier shown that if these two factors work in opposite directions (regarding test success), "early date return" is of more importance. Brown and Krasner's study did not however support the hypothesis that "early date return" has more significance for the depth of hypnosis than expectations.

METHOD


Experiment - time-axis
Questionnaire "Desired and self-predicted susceptibility"
Session 1
I Test of hypnotic susceptibility ("imagination"). Spiegel's Hypnotic Induction Profile (HIP)
2 experiment groups matched (HIP)
1 control group
Session 2
Introduction Information about hypnosis
Shor's personal experience test. The pendulum test.
Manipulation of the feedback about test results
Self-prediction of hypnotic susceptibility
II Test of hypnotic susceptibility SHSS-form A
Interview and self-prediction of susceptibility.

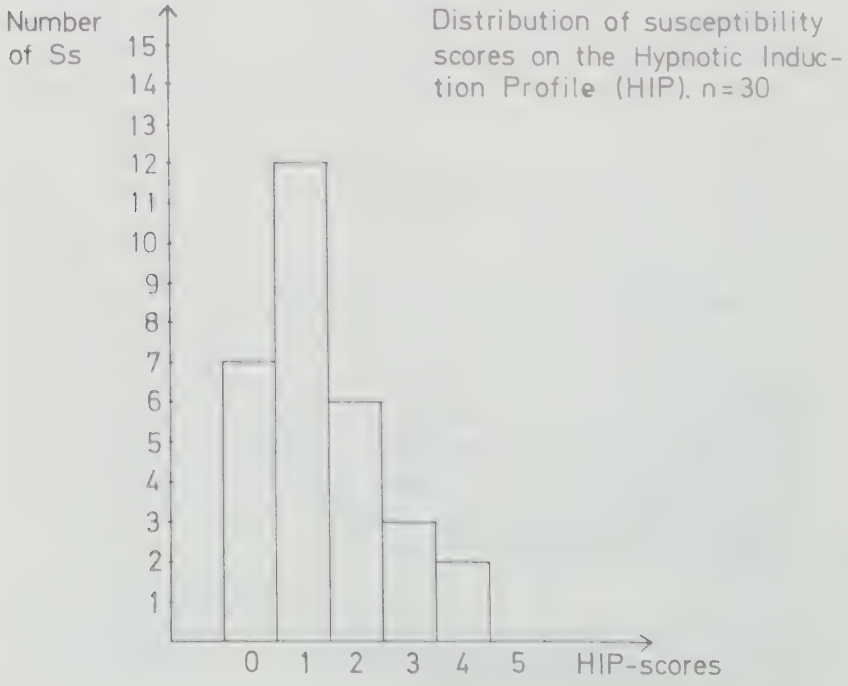
30 Ss, naive for hypnosis, were selected from a questionnaire measuring experience and knowledge of and interest in hypnosis. It also gave a score on self-predicted susceptibility to hypnosis. The base level in the subject's hypnotizability was obtained through Spiegel's Hypnotic Induction Profile (HIP). The Ss were informed that the test measured imagination ability. According to the results in HIP, 20 Ss were matched in two experiment groups and the other 10 Ss were used as a control group. The two experiment groups received positive resp. negative manipulation by a new questionnaire (Shor-scale) and the pendulum test. The "negative" group had their eyes closed and thus received no visual feedback. This gave the

Experimenter the opportunity to manipulate the feedback about the results on the pendulum test. The feedback about the results on the questionnaire were also varied for the two groups. After the manipulation the Ss had to predict their susceptibility to hypnosis in the same way as in the first questionnaire. Finally the Ss went through the second susceptibility test, a modified version of Stanford Hypnotic Susceptibility Scale, form A (max. scores = 10, the first two items removed).

RESULTS

The results of the first testing of susceptibility (HIP) are shown in figure 2:3. The Ss have generally somewhat lower scores than in the investigations by Spiegel. (According to Spiegel 0 - 1 = low susceptible, 2 - 3 = middle and 4 - 5 = high susceptible.) The assumptions were in this experiment a little different as the Ss were informed that the test measured imagination ability.

Figur 2:3



The change in self-predicted susceptibility after the manipulation of the positive and negative groups was manifested in opposite directions and of significant size. (Wilcoxon matched-pairs signed-ranks test $p < 0,05$).

The test results on the second susceptibility test, SHSS-form A are shown in figure 2:4. If the Ss are divided into three groups according to their susceptibility scores a comparison can be made between the two susceptibility scales (table 2:3).

Table 2:3 Distribution of susceptibility according to SHSS and HIP (n = 30).

	Low susceptibility (HIP 0 - 1, SHSS 0 - 3).	Medium susceptibility (HIP 2 - 3, SHSS 4 - 7).	High susceptibility (HIP 4 - 5, SHSS 8 - 10).
Spiegel's HIP	19	9	2
SHSS-form A	8	10	12

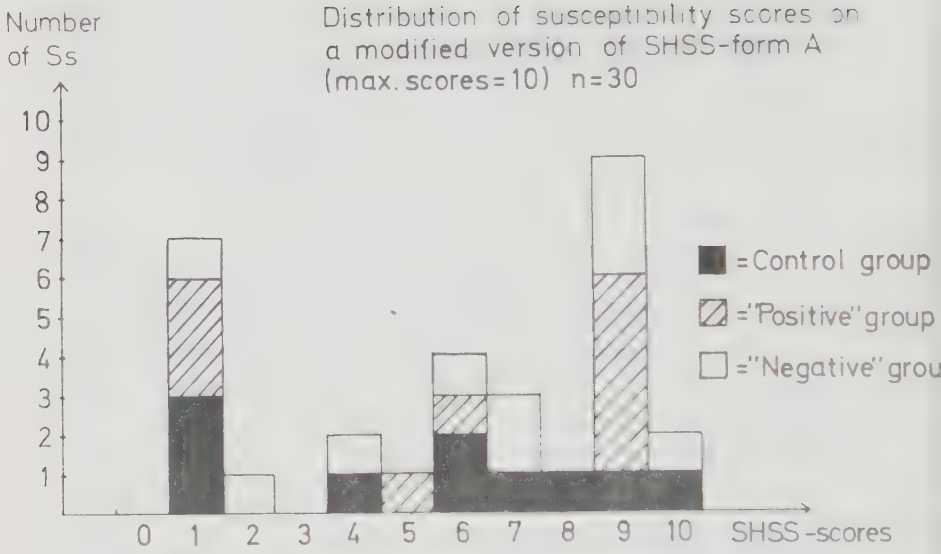
The differences in distributions on the two susceptibility scales may be due to some of the following factors:

a. HIP is "more difficult" than SHSS.
b. Training effects from the first to the second test.
c. Different assumptions, as the HIP was presented as a test of imagination and SHSS as a test of hypnotic susceptibility.

The correlation between HIP and SHSS was 0,76 for the control group and 0,63 for the whole sample.

The results for the different groups (figure 2:4) do not show any differences neither between the control group and any of the experiment group nor between the two experiment groups. The changes in the expected susceptibility thus did not affect the real susceptibility. It can be mentioned that the negative group after the SHSS test still rated their susceptibility as significantly lower than the positive group.

Figure 2:4



DISCUSSION

As the conditions for this experiment were different from the mentioned experiment by Orne the results can neither be said to conform nor oppose the conclusions made by Orne. The results, on the other hand, are a contribution to the debate regarding the importance of situation factors contra individual factors for hypnotic susceptibility. It supports the conclusion made by Hilgard that if a multiple variance analysis of the proposed antecedent conditions to hypnosis was carried out, it should show that only a smaller part of the variance could be attributed to such factors as expectation, motivation, experimenter, induction methods. Rather, the major part of the variance depends on individual differences in their basic susceptibility to hypnosis.

Emerging from the background of a comprehensive overview over hypnotic susceptibility and related factors, the three experiments, related in this chapter, have shown:

1. A bimodal distribution of SHSS-scores in two first experiments.
2. No significant difference in susceptibility-scores between conditions involving induction and test, presented through either hypnotist or taperecorder.
3. A significant negative correlation between SHSS-scores and rigidity, measured by ED_2.
4. Significant correlations between SHSS-scores and primary - but not secondary suggestibility.
5. High correlations between SHSS and motivational versus attitude-factors. This holds presumably only for the first hypnotic session.
6. A significant correlation between SHSS-scores and subjective time distortion under hypnosis.
7. A questionnarie was presented to select highly susceptible Ss in a very simple and fast way.
8. A shorter way of assessing susceptibility was presented.
9. A correlation of 0,63 between SHSS and Spiegel´s Hypnotic Induction Profile was obtained.
10. The manipulation of feedback about test results which changed the subjects´ expectation about their own susceptibility, did not alter the subseqvent scores on the SHSS-form A.

CHAPTER III. POSTHYPNOTIC SUGGESTIONS

Posthypnotic Suggestions (PHS) are, according to the prevalent definition,"suggestions given under hypnosis but working afterwards in the waking state". On the basis of my research on spontaneous trance, I have found that a more adequate definition would be to say: "Posthypnotic suggestions are suggestions given under hypnosis, but the effectuation of these appears after the original trance".

There are two classes of posthypnotic effects; first, changes occurring merely as a result of having been in hypnosis, and, secondly, specific effects that occur as a result of suggestions given during hypnosis.

PHS is one of the outstanding phenomena of hypnosis. On the one occurs in the strength and the quality of the PH performance. other hand, it is one of the phenomena of hypnosis most difficult to explain on theorethical grounds. Why should the suggestion be fulfilled when the Subject has returned from the hypersuggestible state to a state of normal waking consciousness? In order to explain this apparent paradox, many authorities on this subject have maintained that the waking from hypnosis is only apparent and that in fact the subject really remains in a modified hypnotic state until the PHS is finally carried out. This is not a specially plausible explanation as we now know that PHS can be carried out years after the hypnotic programming. Kroger (1963) claims that a PHS and a conditioned reflex serve a similar purpose except that the formeris not established by repetitive trials and learning in the classic sense. A posthypnotic act is often carried out as the result of a single session of "learning"; it is more durable and is not as rapidly extinguished as a conditioned reflex. Kroger claims that a PHS "may last from minutes to years" and he continues "It is generally agreed, however, that on the average it may remain effective for at least two months. During this period, decrement occurs in the strenght and the quality of the PH performance. Periodic reinforcement, however, tends to increase its effectiveness; repeated elicitation does not weaken it".

Subjects can have a total or partial amnesia for the PHS but some can also be quite aware of the suggestion when they carry it out. A voluntary effort to resist the suggestion often creates

tension and anxiety. In this respect there is a clear resemblance to obsessive-compulsive behavior.

Very few studies have been concerned with various aspects of the durability of PHS.

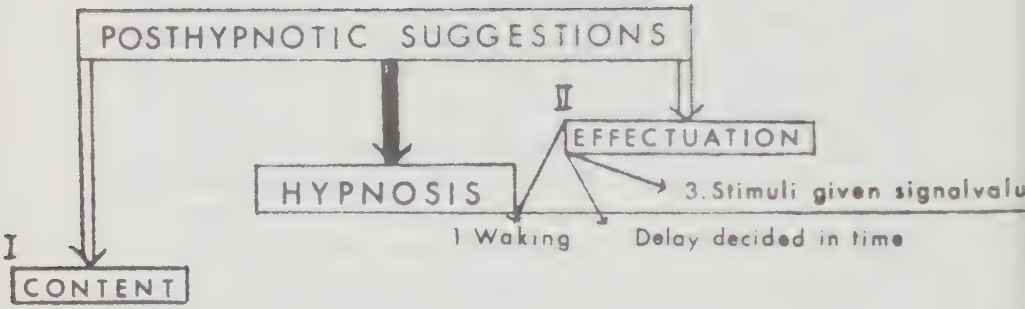
Kellogg (1929) used a PHS to produce change in respiratory rate in response to certain page numbers while reading aloud from a book. Patten (1930) gave the PHS that the subject would depress a key in response to certain words being exposed on a revolving drum. They found that a PHS could last up to 8 months although a considerable subject variability could be detected. No sign of a decay curve similar to extinction was found. They believe that intervening testing can influence and prolong the duration of PHS.

Edwards (1963) gave 10 Ss PHS about slowing of reaction-time every time they heard a buzzer. He also found a considerable subject variability from one subject with a large initial response, which decayed within 1 day, to another subject showing considerable post-hypnotic effect remaining after a year.

Orne (1963) gave PHS to subjects to mail a postcard daily from a stack of cards which was provided. The daily receipts fell off gradually, and much more rapidly than those from a corresponding group invited, without hypnosis, to send in one card each day. Thus the desire to cooperate cannot be a sufficient explanation for posthypnotic compliance.

Since the time of Charcot and Freud, studying rationalization in connection with PHS and up to modern literature on hypnosis one finds that PHS and posthypnotic behavior were often considered as equivalent phenomena and thus treated as synonyms. The few studies concerning PHS which have been carried out have almost all investigated specific behavior. But there are also other types of PHS, which for instance in therapy, play a more important role. I have found it relevant to divide the PHS into different types depending on their content and effectuation. (See figure on next page.) Regarding the content two main types can be distinguished:

A. Suggestions for a specific response, often a certain act.
B. Suggestions for a general state, for instance a certain mood, emotion, activation-level or attitude.



A. Specific response

B. General state

Both types of suggestions can be released in different ways. Through:

1. Awakening
2. A delay of the effectuation decided in time
3. Stimuli, given signal value under hypnosis, for instance a certain word.

The effect of posthypnotic suggestion for an act limited in time ceases when the suggested act has been executed. Suggestions of type B, on the other hand, continue to work until the effect spontaneously ceases or until a new signal is given which abolishes the effect.

Orne (1969) points out that remarkably few studies have been concerned with the mechanisms of posthypnotic suggestions although these represent unique qualities of the hypnosis. The few investigations that have been conducted were concerned with suggestions of type A. They have often been used for studies of unconscious motivation.

An experiment was designed to study the working effect during a short interval after awakening, especially the first half hour after the releasing of the PHS.

A STUDY OF THE WORKING DURATION OF SOME POSTHYPNOTIC SUGGESTIONS (Uneståhl 1972 a.)

METHOD

Subjects

12 Ss, 10 females and 2 males, were selected from a large group, according to their results on SHSS-form A (maximum 12 points).

Ss	Scores on SHSS
6	12
6	11

Procedure

Measurements were made under 9 conditions:

1. Waking without any PHS.
2. PHS - good selfconfidence.
3. PHS - diffidence.
4. PHS - happiness.
5. PHS - anesthesia (left forefinger).
6. PHS - amnesia for counting.
7. PHS - increased ability for counting.
8. PHS - anesthesia (right thumb).
9. PHS - drunkenness.

These 9 conditions were divided on two separate occasions (1 - 6 and 7 - 9). The order of condition 2 and 3 was rotated. In condition 5 and 8 "normal" PHS were given i.e. to feel fine in every way.

Amnesia for PHS was induced in every condition. After awakening, the amnesia was controlled, after which the Ss had to guess if and what kind of PHS they thought they had been given.

Subjective rating were made on Duremans' scale for subjective experience analysis at an interval of 2 and 20 minutes after awakening in every condition; in the last condition, additional ratings after 1 1/2 and 2 1/2 hour were made.

Two performance tests were also used. In the conditions 2, 3, 6 and 7 the Ss were tested on a simple counting test, the multiplication from the DBA-test. Form A was given 2 minutes and form

B 20 minutes after awakening. At arrival and in conditions 2 and 3 the handstrength of the left and right hand was tested on a handdynamometer.

Before the experiment started the Ss were asked to read carefully a page with information about PHS. The same information was given to all Ss with one exception; the information about the durability of the PHS was varied as in table 3:1.

Table 3:1 Information about the durability of PHS.

SCORES ON SHSS	NO INFORMATION	INFORMATION	
		PHS last 1/2 hour	PHS last 8 hours
11	2	2	2
12	2	2	2
Total	4	4	4

RESULTS

Subjective ratings.

The results can be seen in the figures 3:1 - 3:5. Only figure 3:1 shows the complete scale, while figures 3:2 - 3:5 are cut in order to save space.

Figure 3:1 Results on Dureman's ratingscale for subjective experience-analysis (groupmeans).
Estimations made 2 minutes after awakening.
×—× (good) selfconfidence
×--× diffidence

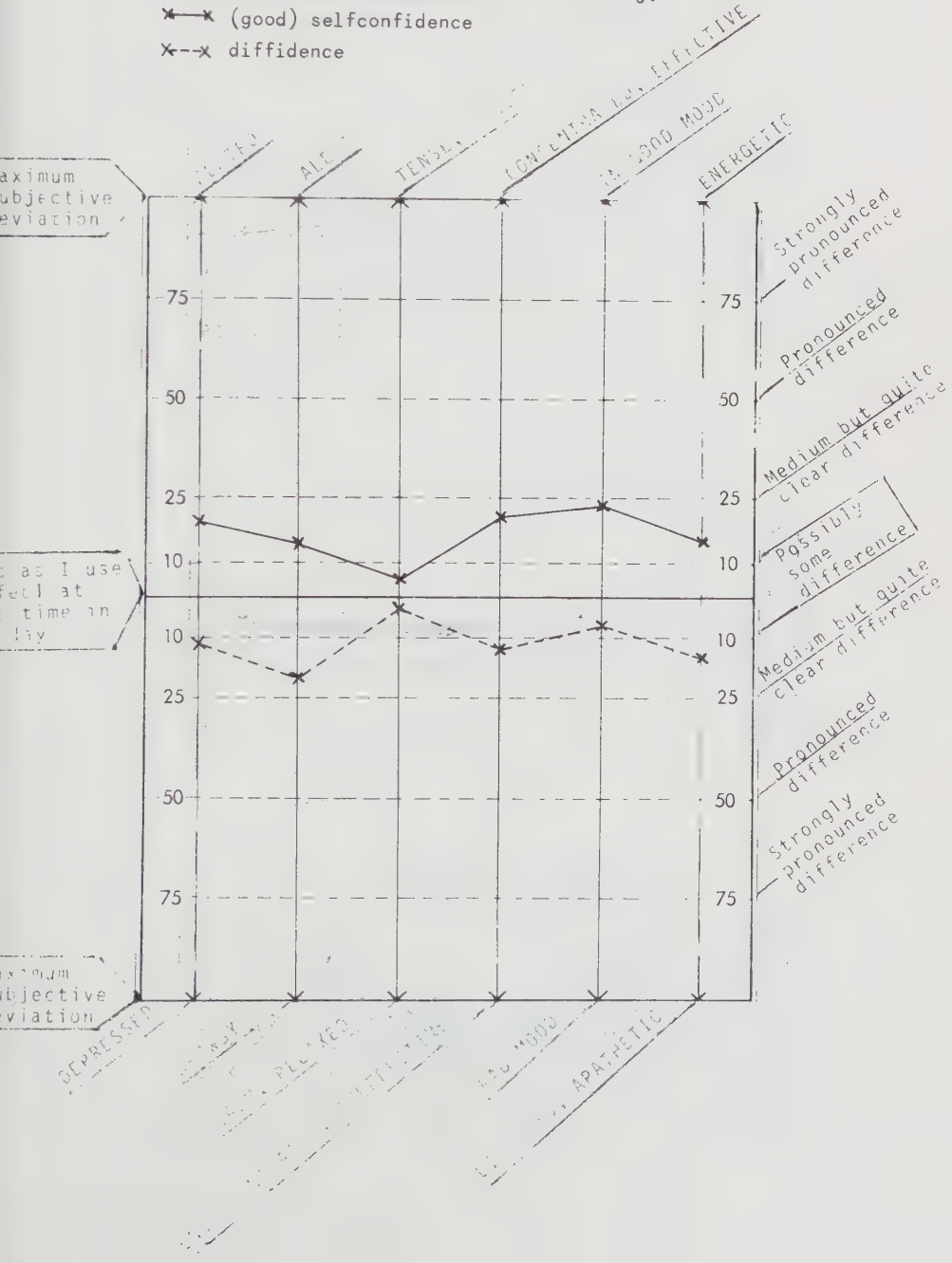
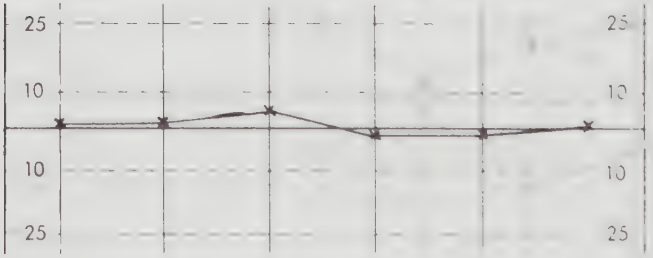


Figure 3:2 Results on Dureman's rating-scale (for complete scale, see fig. 3:1) of arrival I, II and condition I. Estimation made 2 min (×——×) and 20 min (○- - -○) after awakening.

a) Arrival day 1

b) Arrival day 2



c) Condition I: No PHS given

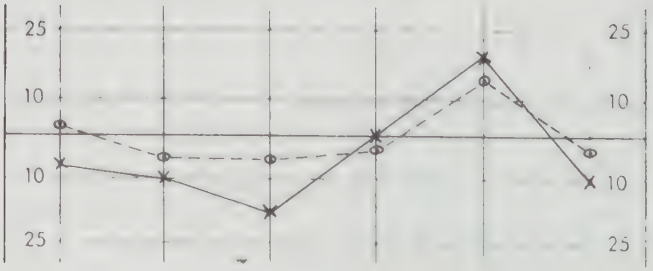
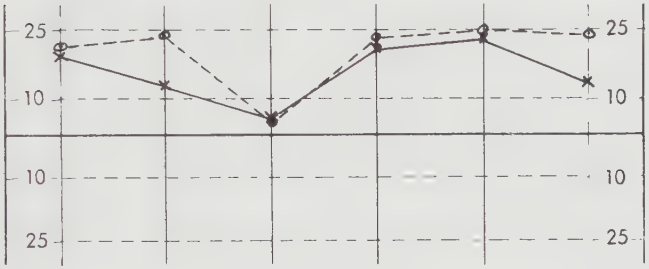
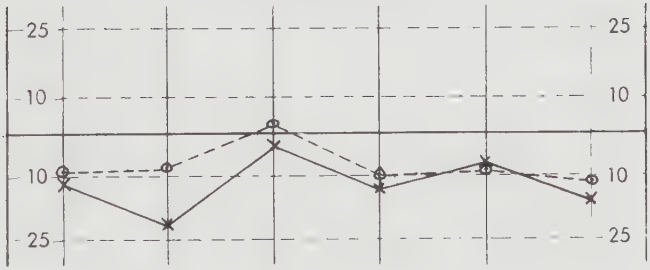


Figure 3:3 Results on Dureman's rating-scale (for complete scale see fig. 3:1) of condition 2, 3 and 4. Estimation made 2 min (×——×) and 20 min (●- - -○) after awakening.

a) Condition 2: PHS - good selfconfidence



b) Condition 3: PHS - bad selfconfidence



c) Condition 4: PHS - happiness

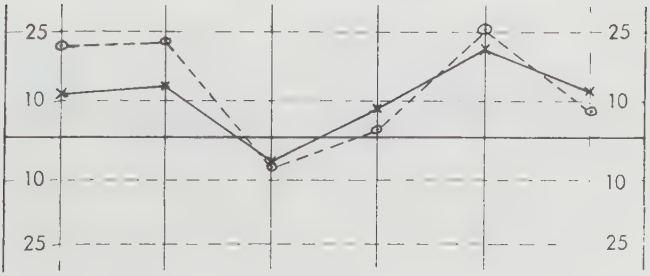
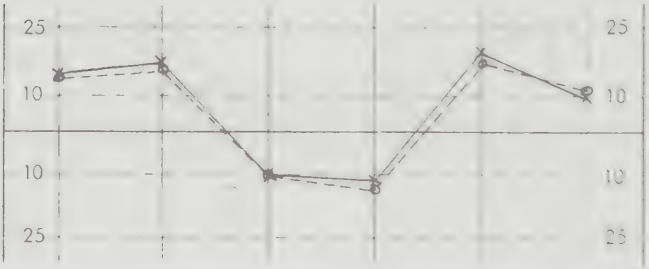
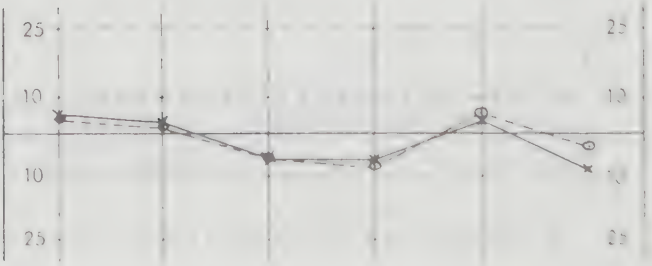


Figure 3:4 Results on Dureman's rating scale (for complete scale see fig. 3:1) of condition 5, 6 and 7. Estimation made 2 min (×——×) and 20 min (⊙---⊙) after awakening.

a) Condition 5: PHS - anesthesia. Normal suggestions.



b) Condition 6: PHS - amnesia for counting.



c) Condition 7: PHS - increased ability for counting.

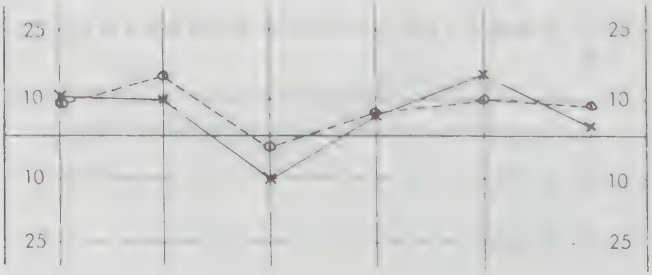
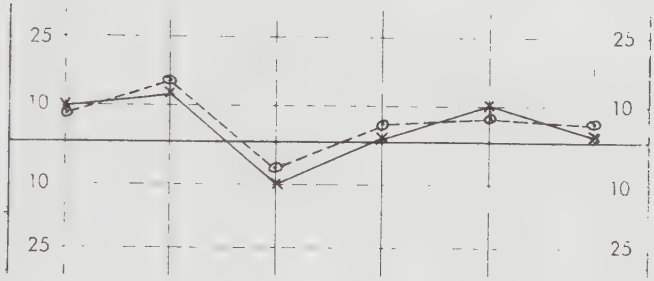
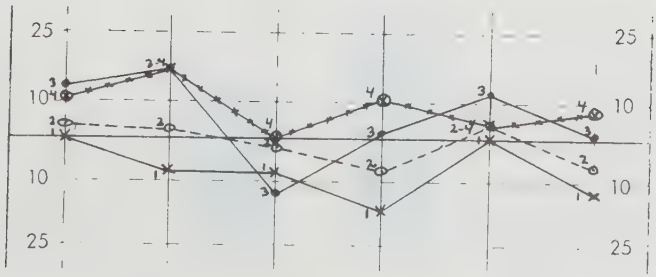


Figure 3:5 Results on Dureman's rating-scale (for complete scale, see fig. 3:1) of conditions 8 and 9.
Estimations made:
2 min (✕——✕)
20 min (⊙– –⊙)
90 min (●——●)
150 min (⊗×××⊗)
after awakening.

a) Condition 8: PHS - anesthesia. Normal suggestions.



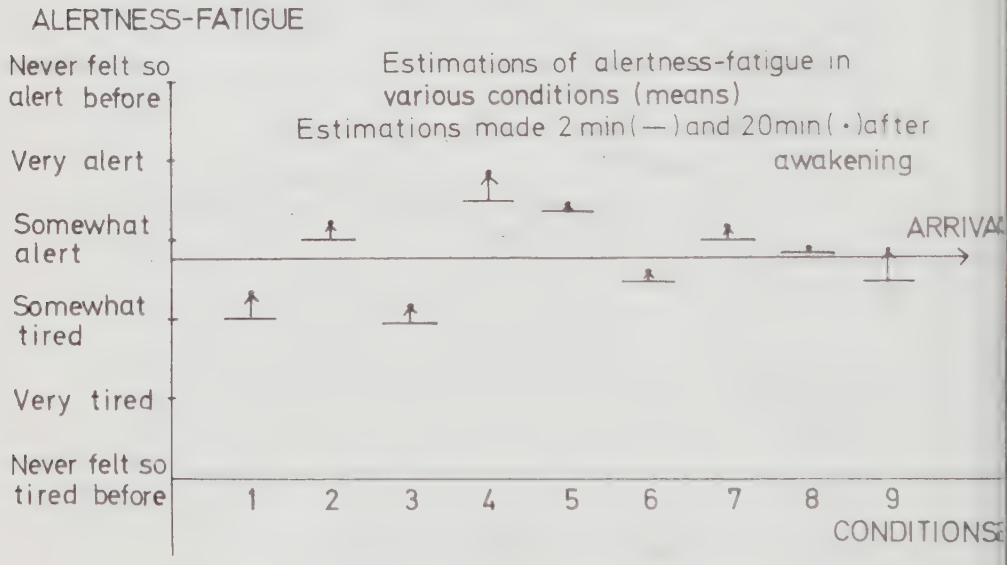
b) Condition 9: PHS - drunkenness.



The subjective ratings manifest themselves clearly in most conditions 2 minutes after awakening. At the second rating period, 18 minutes later, only small changes have occurred. The ratings from the different Ss show great consistency with each other.

Another rating was made in each condition, namely the level of alertness-fatigue. The results of these ratings can be seen in figure 3:6.

Figure 3:6



Condition 4 is the only condition with values, significantly deviating from the estimations made at arrival. A trend can be seen towards more alertness 20 minutes after awakening compared with 2 minutes after, independent of the level at awakening, i.e. the same trend as before; decreasing "negative" and increasing "positive" values.

Performance test.

Hand dynamometer

Before the experiment started, the Ss showed their maximal strength in their left and right hands on a hand dynamometer. They tried twice with each hand and got immediate feedback i.e. the results were revealed to them. In conditions 2 and 3 they repeated the test but this time without feedback. After each trial they had to estimate the results. The instruction was all the time the same: "Press as hard as you can". The results can be seen in table 3:1 and figure 3:7. (The values were taken directly from the scale of the hand dynamometer and were not translated to kp.)

Table 3:1 Result from hand dynamometer (relative values, M Ss).

	ARRIVAL		DIFFIDENCE		GOOD SELFCONFIDENCE	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Objective scores	22,0 21,6	21,9 22,0	21,2 21,2	21,7 21,9	22,9 22,2	23,1 22,3
	21,9		21,5		22,6	
Subjective ratings			18,4 19,0	20,4 20,5	24,0 22,6	23,7 23,5
			19,3		23,5	

Figure 3:7

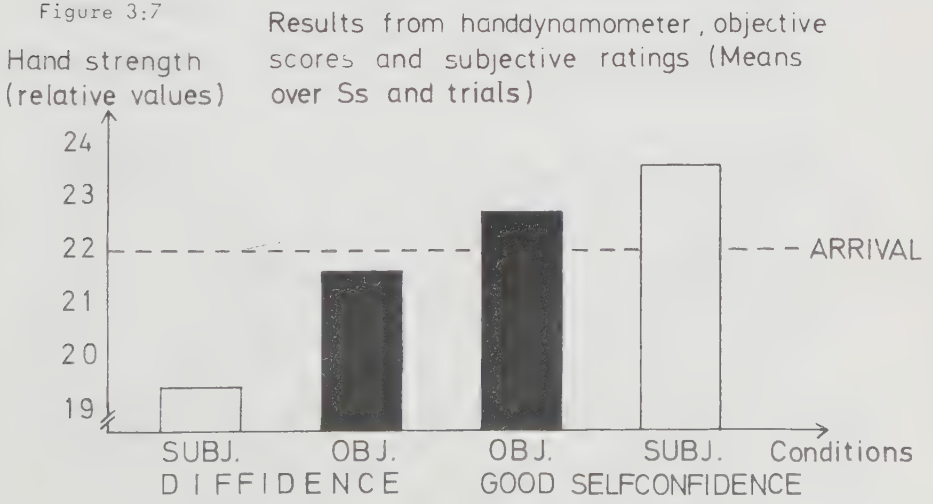


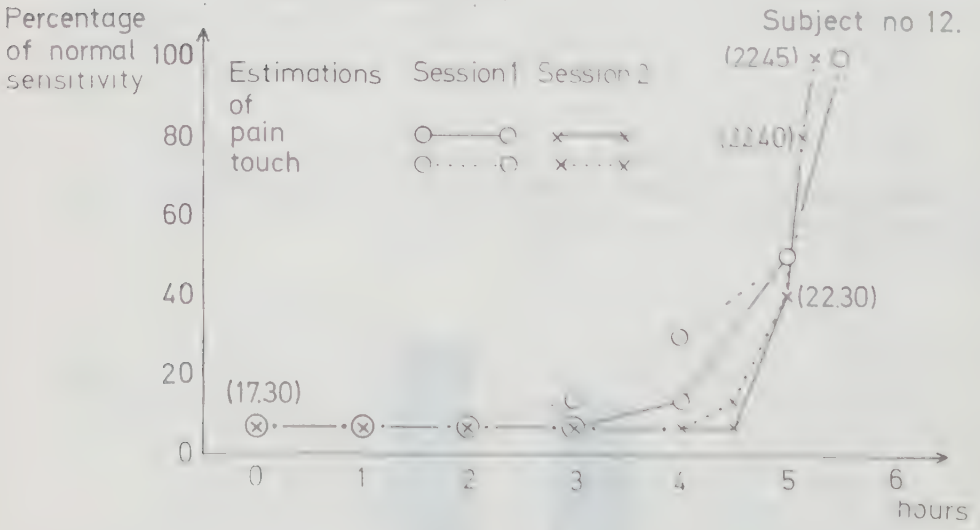
Table 3:2 Results from hand dynamometer. Testing of significance for differences between the conditions (sign-test, p 0,05).

	Subjective ratings		Objective scores	
	Left hand	Right hand	Left hand	Right hand
Diffidence – Good self-confidence	Sign. p=0,002	Sign. p=0,004	Sign. p=0,02	No sign. p=0,055

Thus, even if PHS seems to influence the Ss ability to make use of their hand strength, the suggestions seem to influence still more the subjects´ estimations of their results.

anaesthesia, analgesia.

Figure 3:8 Estimations of percentage of normal sensitivity for pain and touch. PHS about anaesthesia in the left forefinger (session 1) and the right thumb (session 2)



Conditions 5 and 8 contained PHS about anaesthesia in left forefinger and right thumb. The test frequency, every 2nd, every 5th or every 10th minute was varied between the Ss and the two occasions. The Ss rated both loss of pain sensation and kinaesthetic sensations. The result showed that all Ss except one had regained quite normal sensation within 22 minutes (from 5 to 22 minutes). The exception was subject no 12, where PHS continued to work up to 5 hours (figure 3:8). No difference could be seen according to test frequency, the two occasions, left forefinger and right thumb or the prior information regarding PHS.

Counting

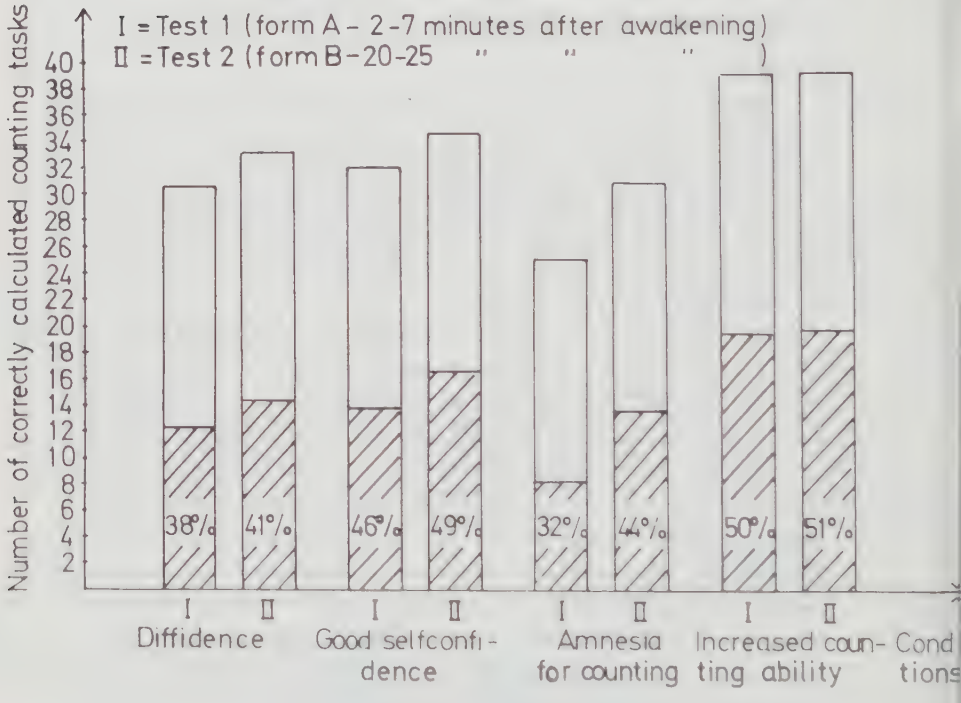
The multiplication test from the DBA-battery was used under the conditions 2, 3, 6, and 7, i.e. after variations in self-confidence and counting ability. The two parallel tests were used, form A 2 - 7 minutes and form B 20 - 25 minutes after awakening. The test time was 3 minutes and the number of correctly calculated tasks were the scores. The Ss maked their positions in the test after each minute.

The results can be seen in figure 3:9. After awakening with good self-confidence there is a trend for higher scores compared with diffidence. However this difference is not significant but twenty minutes later at test II the difference is significant ($p = 0,035$). Between the first and the second testing there is a change in the same direction for both conditions and with the conditions taken together the change is significant ($p = 0,015$). Between the two conditions where the counting ability was affected by the PHS the difference was significant from the beginning (test 1 - $p = 0,008$, test 2 - $p = 0,016$). Only one subject had a complete blocking for counting at both test sessions while the other Ss had larger or smaller difficulties to count. The effect of this negative suggestion was, however, significant less at test session II compared with session I, while the performance after the positive suggestion remained at the same high level at both test sessions.

The relative number of counting tasks after one minute compared with the final results (the percentage figures in the figure 3:9) manifest an interesting tendency. The influence of the PHS, either positive or negative, seems to be largest during the first minute.

Figure 3:9

Number of correctly calculated counting tasks during 4 conditions – after 1 min (1st line) in percentages of the total numbers (3min). (Means)



DISCUSSION

10 Ss had complete amnesia and 2 Ss had partial amnesia for the given PHS. Sometimes they still managed to guess the right PHS, according to them out from their feelings after awakening.

The various PHS do not correspond directly to the variables in the subjective rating scale. They cover instead various dimensions in the induced mental state. The subjective ratings manifest themselves clearly, thus indicating that the Ss investigate and describe their current state and not the specific suggestion which has elicited the state.

One interesting thing can be seen by analyzing the subjective ratings. The Ss seem to react somewhat differently depending on the content of PHS. Positive suggestions have a tendency to increase their strength between 2 and 20 minutes, while the ratings after negative suggestions show a tendency of returning to normal level faster.

The ratings of alertness - fatigue have the same trends (fig. 3:6). After a positive PHS the subject feels more alert than normal and more tired than normal after a negative PHS. This concerns the ratings of 2 minutes after awakening. All the ratings of 20 minutes after awakening show that the Ss feel more alert than 2 minutes after. This holds true also for the objective scores of counting tasks where there is a significant increase in calculated tasks from the first to the second test for the conditions "diffidence" and "good self-confidence" and for the "amnesia" condition.

In the study about posthypnotically induced fatigue (Uneståhl, 1968 b, chapter VIII), the same ratings scale as in figure 3:6 were used 0,15,30,45, and 60 minutes after awakening with PHS about alertness or fatigue.

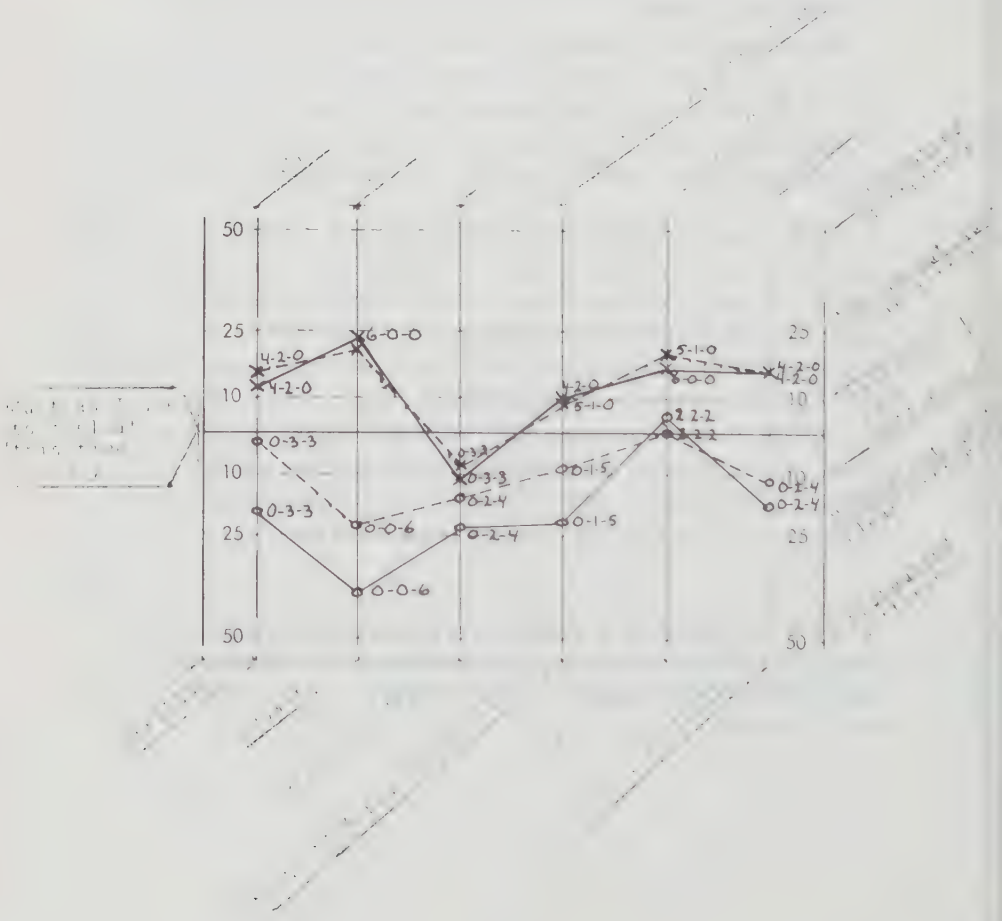
Figure 3:10 Results on Dureman's rating scale (for complete scale see fig. 3:1) after PHS about alertness (xx) and fatigue (oo). Estimations made immediately (-) and 1 hour (---) after awakening (Means)

The figures after the rating means (x-y-z)

x= Number of ratings above the middle line

y= Number of ratings on the middle line

z= Number of ratings below the middle line



If we look at the subject's feelings the first hour after awakening (figure 3:10) we can see the same tendency as mentioned before, the "negative" effects are considerably reduced. The positive effects are not increasing any more but remain one hour after awakening, at the same level as just before awakening. The differences between the two conditions in estimated feelings are significant for four of the six rated variables. In spite of the decrease of the "negative" feelings the differences are still significant one hour later.

The instructions in condition 6 concerned a total blocking of the counting ability, but only one subject showed a total amnesia for counting. The other Ss reacted only with a somewhat decreased counting ability. The subject with the total blocking was asked to wait for a spontaneous return of the counting ability. After two weaks, still having a similar considerable blocking, she did not want to continue. With a new hypnosis induction the earlier induced suggestion were terminated and the counting ability was thus immediately regained. As this person spoke fluent german after spending three years in Germany, a similar study was made later with blocking the german language. Even here the blocking was total. In this case the ability returned spontaneously after a few days. She dreamed that she was in Germany and said something in german. After awakening the blocking was gone.
More about blocking will be taken up in the next chapter.

The increasing values of the "positive" PHS may be due to a decay of the spontaneous posthypnotic effects. Many Ss feel somewhat disorientated after awakening and have for a short while some feelings of trance-quality. Spontaneous posthypnotic effects seem to appear independent of if and what kind of PHS have been induced. These posthypnotic effects may have an inhibitory effect on the induced PHS. This explanation is, however, not valid for "negative" PHS, which change in the opposite direction. This gradually deteriorating from the very beginning after awakening may be due to an unconscious resistance which counterworks the negative PHS even when the Ss are not aware of the PHS. This resistance might also explain one of the findings in the experiment with cardriving in a simulator (chapter VIII), where a trend was found for prolonged awakening time after negative PHS compared with positive PHS.

PHS, RELEASED BY SIGNALS

All PHS that have been previously mentioned have been of type B 1 i.e. general states released by awakening. Another way of releasing PHS is using various stimuli, given signalvalue under hypnosis. Some data will be mentioned from studies using such PHS.

In one study (Uneståhl et al., 1971 f) the posthypnotic behavior "walk over the floor and pick up that book on the table" was released by the signal word "Sinduli". In two other conditions "left arm rigidity" was released by the signal word "Barvani" and "fatigue" by the signal word "Bishnat". The posthypnotic effects were allowed to fade spontaneously. The first PHS was of type A 3, which disappears as soon as the behavior is executed. Five subjects manifested the behavior "left arm rigidity" which lasted between 3 and 17 minutes. Four subjects manifested "fatigue" with a duration of 5 to 25 minutes.

In another study (Uneståhl, 1969 b) colour-blindness was induced with a signal word and abolished with another signal word. The subject with the strongest response was chosen as a case study in order to investigate the durability of PHS. The PHS was released by a signal word on different occasions.

Table 3:2 The durability or working effect for colour-blindness (hours).

a) 4 Ss, 1 occasion

b) 1 subject, 7 occasions

Ss	Total time	Occasion	1	2	3	4	5	6
1	4	waking	4	2	5,5	2 3/4	7	7 1/2
2	9,5	sleeping	0	0	9	0	6 1/2	8
5	1/3	total	4	2	14,5	2 3/4	13 1/2	15 1/2
7	1/3(green) 5 (red)							

On the 7th occasion the CB was working 4 days, after which the PHS was abolished. The results indicate a big inter- and intra-individual variability with a weak tendency of increasing durability with the repeating of the signal (only 1 subject). The two colours allways returned at the same time with the exception of one occasion. Sleep does not seem to abolish the effect.

COMMENT

In some studies (Unestähl, 1968 b,c) the duration of the PHS is determined during programming under hypnosis. In other experiments (Unestähl, 1969 b, 1970 a, 1971 a, 1974 c) the Ss retrieved normality by an antisignal. The studies, reported in this chapter, are those where nothing has been said about the durability of PHS during hypnosis and where the possibility has been given for the PHS to fade away spontaneously. Big differences can be seen in working duration of the PHS, from a few minutes to some days. Some factors related to the variance seem to be:

Individual factors: Susceptibility to hypnosis can not be the only individual factor of importance since the subjects in some of the studies have had the same hypnotizability score (SHSS).

Type of PHS: As mentioned before the PHS of A-type cease when the suggested behavior is executed, so working duration here depends on the behavior. Among the PHS of B-type a variation can also be seen. No study has been done to investigate the relation between types of PHS and their durability, but from these studies, reported, blocking type of PHS seems to last longer than many others.

Positive-negative PHS: Between the two rating occasions (2 and 20 minutes) in the first study, positive PHS seem to increase and negative PHS decrease in strength and quality.

What about this information in textbooks on hypnosis that PHS can last for months or for years? I am inclined to disagree with this statement since it is based on the fact that no distinction is made between on one hand the durability of PHS and on the other hand the ability of the post-hypnotic signal to elicit the programmed effect.

Therefore it is actually not the PHS which lasts for years, but rather the signal which can keep its signal value for years so that every time it appears, the suggested effect will be elicited again.

This chapter has shown that:

1. It is meaningful to divide the PHS in two types regarding the content (A - B) and three types regarding their effectuation (1, 2, 3).
2. The PHS of A-type cease when the suggested behavior is completed, thus working duration of PHS depends on the behavior.
3. The durability or working duration of PHS of B-type can also be controlled by:
   a) Suggesting the duration under hypnosis.
   b) A signal which is programmed so that the signal always terminates the suggested effect (antisignal).
4. If the working duration is not steered, the effect of PHS will spontaneously fade away after some minutes or hours or in exceptional cases after a few days.
5. The variation of the working duration seems to be related to:
   a) Individual factors, where susceptibility to hypnosis does not seem to be the only factor of importance.
   b) Type of PHS, where in these studies blocking type of PHS seems to last longer than many others.
   c) Positive-negative PHS, where for instance positive PHS increase and negative PHS decrease in strength during the first 20 minutes after releasing the effect. Even a trend for a prolonged awakening after negative PHS compared with positive could be seen.
6. No detectable effect of durability of PHS could be observed in these studies of such factors as testfrequency and variations in expectancy, however for a conclusive statement further investigation is required.
7. Releasing of induced PHS of type B 1, manifests obvious effects above all on the subjective side but also on the behavioural side.
8. The effectuation of for instance diffidence and good self-confidence manifests itself on the performance test, but still more on the individual's subjective estimation of his own performance.

9. The subjective ratings in these studies describe different aspects of the induced state and not only the specific PHS involved.

10. Statements in textbooks on hypnosis that PHS can last for years arise from the confusion between the durability of PHS and the signal's ability to elicit the programmed effect. The PHS fade away rather quickly but the signal can reatin its signal value and release the PHS even years after the original programming.

CHAPTER IV. POSTHYPNOTIC TRANCE

The effectuation of a posthypnotic suggestion often seems to be accompanied by a posthypnotic or a spontaneous trance (ST), i.e. a trance which has not been suggested or expected. The posthypnotic or spontaneous trance has earlier mainly been described by M.H. Erickson (1967). His findings can be summarized as follows:

1. Although there has been frequent recognition that posthypnotic suggestions lead to the development of a peculiar mental state in the hypnotic subject, there has been no direct study of that special mental condition. Neither has there been provision or allowance made for its existence and its possible significant influences upon results obtained from posthypnotic suggestions.
2. The specific manifestations which occur rapidly in direct relation to the giving of the specified cue for the posthypnotic act often have the following sequence: A slight pause in the subject's immediate activity, a facial expression of distraction and detachment, a peculiar glassiness of the eyes with a dilatation of the pupils and a failure to focus, a condition of catalepsy, a fixity and narrowing of attention, an intentness of purpose, a marked loss of contact with the general environment and an unresponsiveness to any external stimulus.
3. The spontaneous post-hypnotic trance may be single or multiple, brief or prolonged. In general, it appears for only a moment or two at the initiation of the post-hypnotic performance and hence it is easily overlooked.
4. Demonstrations and testing of the spontaneous trance are usually best accomplished at the moment of the initiation of the post-hypnotic performance by interference either with the subject or with the suggested act. Properly given, such interference ordinarily leads to an immediate arrest

in the subject's behavior and a prolongation of the spontaneous trance.

5. The lapse of an indefinite period of time between the giving of a post-hypnotic suggestion and the opportunity for its execution does not affect the development of a spontaneous post-hypnotic trance as an integral of the post-hypnotic performance.
6. Apparent exceptions to the development of the spontaneous trance as an integral part of the post-hypnotic performances are found to derive from significant changes in the intended post-hypnotic situation which alter or transform it into one of another character.
7. The spontaneous trance is a phenomenon of sequence, since it constitutes a revivification of the hypnotic elements of the trance situation in which the specific post-hypnotic suggestion was given. Hence, its development is a criterion of the validity of the previous trance.
8. The spontaneous trance may be used advantageously as a special experimental and therapeutic technique, since it obviates various difficulties inherent in the usual method of trance induction.
9. The post-hypnotic performance and its associated spontaneous trance constitute dissociation phenomena because they break into the ordinary stream of conscious activity as interpellations and since they do not become integrated with the ordinary course of conscious activity.

Except for the observations of Milton H. Erickson, the studies on ST have been made exclusively here in Uppsala. Göran Berger (1972) constructed a one-dimensional scale on the basis of information analysis theory. As a measure of suggestibility the concept of transmission was used. The degree of transmission was based on the S's subjective estimation of a tone stimulus which was presented

with varying degrees of veridicality. By using multivariate information analysis transmission values for hypnosis as well as spontaneous trance can be otained. The maximum value for the scale was 1.59 Compared with the Stanford Hypnotic Scale of Susceptibility, form A, SHSS-scores on 0-2 gave a mean transmission value (M_T) on 0.03; SHSS-scores between 5 and 10 gave a M_T on 0.16 and a SHSS-score on 12 gave a M_T on 0.82. The scale has an increasing discriminatory ability with higher SHSS-scores. Ss with the maximum SHSS-score of 12 can be clearly differentiated by the transmission scale.

In one study (Gessbo & Möcker, 1969) the transmission values were compared in hypnosis and spontaneous trance. Only the Ss with a deeper original hypnotic trance showed an evidence of a spontaneous trance. The results gave some support to the theory that the spontaneous trance should be a revivification of the original hypnotic trance.

In the first experiments studying ST (Uneståhl et al., 1968 e, Uneståhl, 1969 a,b), colour blindness was chosen as the PHS, i.e. blocking of the red and green colours.

POSTHYPNOTICALLY INDUCED COLOUR BLINDNESS (Uneståhl, 1969 b).

METHOD

Time axis

- Standard shock given
- 12 shocks-3 min. randomized
  Passive 3 min.
- Hypnotic induction.
- Programming of signal, intended to release colour blindness
- 1 min. passive. Presentation of 16 compound colours-4 min.
- Posthypnotic signal
- 1 min. passive 16 compound colours-4 min.
- Antisignal
- 1 min. passive 16 compound colours-4 min. Posthypnotic signal 1 min. passive 12 shocks-3 min. 16 compound colours-4 min. Antisignal 1 min. passive 12 shocks-3 min. 16 compound colours-4 min. Passi 3 mi

7 susceptible Ss were picked out for the experiment.

Two different stimuli words were given signal values under hypnosis, one signal inducing the colour blindness and one anti-signal abolishing the influence of the first signal and restoring the normal colour vision In the main experiment the signal and the anti-signal were given twice. In the pre-experiments an and follow up, on the other hand, the suggestion effects were to cease spontaneously before the signal was given again. This was also done to get an idea of the working duration of this type of suggestion and possible changes by repeated effectuation.

Independent variables were:

1. State of consciousness
   a) awake (normal)
   b) hypnosis
   c) posthypnotically awake
   d) posthypnosis (posthypnotic suggestion working)

2. Stimuli
   a) presentation of colours
   b) administration of electrical shock.

Dependent variables were:

1. Autonome registration
   a) respiration
   b) pulse
   c) DC - PGR SRL
   d) AC - PGR SRR
2. Estimations of experienced colour
3. Time of latency for colour-estimations
4. Estimations of experienced electrical shock.

SOME RESULTS DISCUSSED

During the first pre-experiments it was shown that the Ss had amnesia for the signal word and some time after the signal was given, but the amnesia did not last for all the period during which the posthypnotic suggestion was working. During the fourth pre-experiment it was found by coincidence that the effectuation of the posthypnotic suggestion was accompanied by total anesthesia of some minutes' duration which then totally disappeared. The time of anesthesia was found to coincide completely with the time of amnesia and extended over a period during which the Ss also showed several of the earlier mentioned external signs of spontaneous trance. The hypothesis that anesthesia is a more general indicator of spontaneous trance received strong support in the main experiment where anaesthesia appeared with all seven Ss in connection with the administration of electrical shock during the posthypnotic period and the others felt the shock weaker than at other times. Thus, anaesthesia seems to be a good and objective criteria of the spontaneous trance that also gives a possibility to decide the duration of the spontaneous trance more exactly.

ST as reactivation of original trance

Milton Erickson has shown that if a PHS together with a cue is given, when the Ss are discussing a certain topic, the cue will later release the PHS. If the subject is arrested when he begins to carry out the PHS, he will show signs of a trance state. If one then comments: "I forgot what you just said" the S will continue with the previous discussion which he had started when the PHS was given, for instance one week earlier. Milton Erickson means that such observations support the view that the Ss are back in the original trance, carrying out the activity when the PHS was given.

To test the hypothesis that the ST is a reactivation of the elements in the original trance, some autonomic measurements were made during hypnosis and programming of the PHS and during the periods after the posthypnotic signal and anti-signal, two of each were given, and one passive minute after each signal gave the values.

Table IV:1 Parallel and non-parallel changes between hypnosis and posthypnotic periods.

Subjects	Respiration	Pulse	BR	SF	
1	x(-)	x(-)	x(-)	x(+)	4
2	x(-)	x(-)	0	x(+)	3
3	x(-)	0	x(-)	0	2
4	0	x(+)	0	0	1
5	x(-)	x(+)	x(-)	x(-)	4
6	x(-)	0	0	0	1
7	x(-)	0	x(-)	x(+)	3
Total	6	4	4	4	18

x = Parallellity (-) decreasing values during both
(+) increasing values during both
0 = No parallellity

Criterium on parallellity: change with at least 10% more than the passive minutes in the other conditions.

The Ss showed parallel changes between hypnosis and the posthypnotic periods on 18 of the 28 occasions with respiration having the highest parallellity (6 of 7).

The results must however be interpreted with some reservation. One minute is a short period to measure changes in autonomic variables but can still be too long here as the ST is often of a shorter duration than 1 minute. Another difficulty is the lack of any typi-

cal autonomic pattern during hypnosis (see chapter 1). A smaller difference between hypnosis and wakefulness in autonomic measures makes it more difficult to interpret posthypnotic measure values as parallel to hypnosis.

Thus, a new experiment was designed (Uneståhl et al, 1971 f).

ATYPICAL BEHAVIOR DURING HYPNOSIS RELATED TO SUBJECT EXPECTATIONS

PHS were planned to be given during hypnosis at a time when the Ss were manifesting a typical behavior for hypnosis. Before the hypnotic induction the subject was given an instruction implying that a certain behavior is always manifested in the hypnotic state. The false expectation, thus created, implied that the right arm always raises in hypnosis. The subject was then hypnotized and the appearance of the atypical hypnotic behavior was checked. Next the posthypnotic state was induced. According to Ericksons's reactivation theory arm raising would be expected also in the posthypnotic trance.

If the atypical behavior would occur together with the other indicators of posthypnotic trance (amnesia and anesthesia) this behavior may be used as another indicator of posthypnotic trance. Moreover it would support the proposition that posthypnotic trance is a reactivation of the original hypnotic trance.

In addition, time correlations between posthypnotic trance and posthypnotic behavior and their intraindividual patterns were studied. From Uneståhl's paradigm (p.) concerning posthypnotic suggestions the following problems can be derived: Duration of the posthypnotic trance in relation to the induced behavior or the induced general state. Is the posthypnotic effect released al-

ready during the posthypnotic trance or not until the trance has disappeared? The duration of the posthypnotic behavior in relation to the posthypnotic trance.

Other problems studied were: Duration of the posthypnotic suggestions, duration of the indicators of the posthypnotic trance, the correlation between the duration of the posthypnotic trance and the duration of posthypnotic suggestions.

Experiment I

A questionnaire concerning hypnotic susceptibility was administered to 94 persons. Of these, 9 were selected as subjects. Condition A was perceived by a verbal instruction implying that it is typical for a hypnotized person to feel that his right arm will raise. In condition A the subject's hypnotic susceptibility was measured by a shortened version of the SHSS A. Subjects who raised their right arm or scored on the amnesia item or passed both criteria were allowed to proceed to the following three conditions. Conditions B - D consisted of a hypnotic induction and a suggestion implying a posthypnotic signal-released behavior or state. In condition B the posthypnotic behavior "walk over the floor and pick up the book on the table" was released by the signal word "Sinduli". In condition C "left arm rigidity" was released by the signal word "Barvani", and in condition D the posthypnotic state "fatigue" by the signal word "Bishnat". The posthypnotic effects were allowed to fade spontaneously. The posthypnotic trance was studied by the indicator "amnesia".

None of the subjects raised their right arm during hypnosis. Only one subject scored on the amnesia item and was thus allowed to proceed to conditions B - D. An analysis of the results from

experiment I showed that the arm-raising response probably would be facilitated by tacti e suggestions during hypnosis in addition to the verbal instruction.

Experiment II

Methodologically experiment II differed from experiment I in two respects: during the induction in condition A the subject was given tactile suggestions i.e. the experimenter lifted the subject's right arm twice. Also when testing for post-hypnotic trance another indicator, anesthesia was used.

The questionnaire was administered to another 56 persons and 15 were selected as subjects. Of these 15 subjects 5 were allowed to proceed to conditions B - D since they raised their arm or raised the arms and passed the amnesia item, and one subject proceeded after having passed the amnesia item only.

That 5 subjects out of 15 raised their right arm during the hypnotic inductions slightly supports the hypothesis that the arm lifting response is facilitated if tactile suggestions during hypnosis are added to the verbal instruction. One subject raised her arm also during the posthypnotic trance. Thus, an atypical behavior appearing during hypnosis may reappear during posthypnotic trance, an observation giving some small support to Erickson's reactivation theory. The arm lifting response during posthypnotic trance lasted during the same interval as the other indicators of posthypnotic trance (amnesia and anesthesia). The arm lifting response then worked as an indicator of posthypnotic trance.

Thus the studies mentioned have given some, but not very strong and clear, support to Erickson's reactivation theory. Furthermore, our measurable criteria of ST have been spontaneous amnesia and anesthesia. These phenomena can occur spontaneously also during common hypnosis, but in rather few Ss. Especially is spontaneous anesthesia a very rare phenomenon, while we in our stu-

dies have measured ST by anesthesia in many Ss There are also other apparent differences between common hypnosis and ST. Even if highly susceptible Ss can be taught to enter hypnosis very quickly by a signal. Hilgard (1973) has shown that it takes some time to establish such a depth, where for instance suggestions of anesthesia will be effective. ST on the other hand seems to appear immediately and occasionally last during a short time, probably during still shorter periods than the few seconds we needed to measure it. Milton Erickson's observations were also made in a different way, he prolonged the ST by arresting the behavior of the S and created perhaps in this way a trance with somewhat different characteristics, while our investigations have been on ST as such. On the basis of the evidence from our studies, I am apt to disagree with M. Erickson's idea of ST as sole reactivation of the specific element of the original trance.

THE DURATION OF ST

A STUDY OF SIGNAL-RELEASED POST-HYPNOTIC SUGGESTION

As being one of the first studies made on ST (Uneståhl, 1970 a) I tried to investigate some preliminary answers to the following questions:

1. What is the duration of the ST, measured as the period of spontaneous anesthesia?
2. Is the anti-signal (ending the effect of the suggestion) a post-hypnotic suggestion of the same kind as the signal?
3. Are there any differences in the duration of the trance between signal- and anti-signal triggered suggestions?
4. Will there be any differences in the duration of the trance with the repeating of the signal-words?
5. Will the post-hypnotic suggestion start to work in or after period 1 (the spontaneous trance)?
6. Will there be any difference in GSR, if the electric

shocks are given in or outside the spontaneous trance?

7. Will there be any visual and/or auditive blocking of the signal-words, and if so, will it generalize also for words similar to the signal words?

6 Ss with SHSS-scores between 9 and 12 took part. Electric shocks were given rather often during the experiments and anesthesia was taken as an indicator of spontaneous trance. The post-hypnotic suggestions concerned the left leg which should raise after the signal and sink down to normal position after the anti-signal. Both signals were presented twice each. After removing the GSR-electrodes the Ss were given the idea that the investigation was finished, whereupon the signal was again suddenly presented.

Blocking of the signal-words was checked by urging the Ss to read, write and repeat words and sentences containing sound combinations of varying similarity to the signal and anti-signal.

RESULTS

Only the results illustrating the duration of ST are presented in this chapter.

Table IV:2 Number of shocks with no reaction after the signal

Ss	1	2	3	4	5	6	7	
SHSS-score	9	12	11	11	9	9	11	Total
Signal 1	5	4	0	0	0	5	0	14
2	9	6	0	0	0	0	1	16
3	3	5	0	1	0	0	1	10
4	4	14	0	0	0	0	1	19
5	2	14	0	1	0	1	1	19
Total	23	43	0	2	0	6	4	78

Table IV:3 Number of shocks with no reaction after the anti-signal.

Ss		1	2	3	4	5	6	7	
SHSS-score		9	12	11	11	9	9	11	Total
Anti-signal	1	2	4	0	0	0	0	1	7
	2	1	2	0	2	0	0	1	6
	3	2	3	0	1	0	0	1	7
	4	2	4	0	0	0	0	1	7
	5	3	4	0	1	0	0	0	8
Total		10	17	0	4	0	0	4	35

Table IV:4 The duration of the spontaneous trance (time in sec. from the signal/anti-signal to the first reaction to the shock. Mean of the 5 presentations).

Ss	1	2	3	4	5	6	7	Total
After signal	33	71	0	2	0	9	4	119
After anti-signal	11	21	0	4	0	0	4	40

Out of the 7 Ss five manifested a measurable ST, and of these five four manifested ST both after the signal and the anti-signal. A big individual variability in ST duration from 2 to 33 seconds can be seen. No relation can be found between the sign and duration of ST and the different depth of hypnosis represented in the study. The S with the highest ST-duration had obviously the highest SHSS-score (12), but the second S has only 9 SHSS-score. The anesthesia is generally concentrated to the period followed immediately by signal and anti-signal, but can exceptionally be scattered over the whole posthypnotic period. The anti-signal seems to be a posthypnotic signal of essentially the same character as the signal but a tendency for a longer duration of ST after the

signal compared with the anti-signal was found, No systematic change in the duration of ST with repeating of the signal and anti-signal was found.

POST-HYPNOTICALLY INDUCED ANAESTHESIA AND HYPERAESTHESIA

The next study (Uneståhl et al., 1971 c) investigating the duration of ST had also the purpose mainly to study the effects of signal-triggered posthypnotic suggestions upon physiological variables and subjective ratings of painful stimuli, and further the efficiency and duration of the two posthypnotic suggestions.

Main hypothesis: (A) Physiological (GSR) as well as subjective responses to pain tend to move in the direction of increased response when hyperanesthesia is suggested and in the opposite direction after suggestions for anesthesia.

(B) Both signals will be followed by a period of anesthesia of varying duration for different Ss.

METHOD

A questionnaire was administered to 250 Ss measuring interest in hypnosis, motivation to be hypnotized and self-prediction of the S's hypnotic susceptibility. The 40 Ss with the highest total score were then tested with the SHSS (form A), since a positive correlation between these variables and suggestibility had been found in an earlier study. These 40 Ss also estimated their susceptibility after hypnosis. 11 Ss with a SHSS-score of 11 or 12 were selected for the experiment. Hypnosis and all instructions were given through a tape recorder.

Before hypnosis was induced again, the Ss were given electric shocks in the right hand and instructed to estimate the strength according to a predetermined scale with a standard = 10. During the whole experiment the shocks were always given with identical intensity, the Ss being unaware of this. Every series of shocks lasted for 7 minutes and was built up by 15 shocks separated by

random intervals.

Under hypnosis two different words were given posthypnotic signal value. One word (S_1) aimed to remove all sensation from the right hand when given posthypnotically and the other word (S_2) aimed to increase the sensitivity of the same hand. The duration of the suggestions was not specified and suggestions for amnesia were given under hypnosis.

After the Ss were awakened from hypnosis the schedule of shocks was run and a record kept over GSR and the subjective estimations of shock strength.

The S_1 was given by tape-recorder and the signal was immediately followed by 5 shocks during the first 45 seconds for checking the spontaneous trance. The duration of the spontaneous trance was investigated by studying the duration of the anesthetical period following the signal-words. After the 45 seconds the ordinary series of shocks was administered.

S_2 followed and the procedure above was repeated. After this the two signals were again presented in the same manner followed by the shocks.

During the shock-ratings the Ss listened to soft music and after the experiment an interview was made to find out if amnesia for the signals and shocks had occurred.

The 8 Ss who showed spontaneous trance and amnesia came back 24 hours later and the shocks were again administered first once without any preparation then twice for each signal.

The procedure was repeated 48 hours after the experiment with 6 Ss. All Ss were hypnotized after the last experiment they participated in and the suggestions were removed.

RESULTS AND DISCUSSION

As only these individuals with the highest scores on the three

variables in the questionnaire were tested with the SHSS, no significant correlations were found between these three variables and hypnotic susceptibility, but the post-hypnotically estimated susceptibility correlated significantly with the SHSS-scores, r = 0,55 sign 1%.

Anesthesia, criterion of spontaneous trance occurred in 7 of the 11 Ss despite the fact that the signal for hyperanesthesia was given. In an earlier investigation it was found that the effect of the posthypnotic suggestion begins already during the spontaneous trance, but in this case the effect was blocked by the anesthesia accompanying the spontaneous trance. The effect of the posthypnotic suggestion starts in this case when the spontaneous trance is over.

The duration of this trance varied from 5 to 120 seconds. For 2 Ss spontaneous trance occurred although no amnesia was found. Thus spontaneous trance is not necessarily followed by amnesia.

On the third day after the induction of the posthypnotic suggestions spontaneous trance occurred for 2 Ss only (see table IV:5, next page).

A t-test of the differences of estimations during the first 45 seconds after the signals yielded a t = 2,68, sign 1%. The GSR-differences were not significant.

The differences of the subjective estimations for the whole period were in the direction of the hypothesis, but did not reach statistical significance. When the 15 estimations were grouped 5 and 5, an increasing difference was found, which may be interpreted as a result of the decreasing intensity of the spontaneous trance.

The estimations of shock-intensity before the signals were given were found to be higher than the estimations after both signals. A probable explanation is that the ST has lowered the values in approximately the same manner for both conditions.

Table IV:5 Means of estimations of shock-intensity during the first 45 seconds following the signals

	Ss	1	2	3	4	5	6	7	8	9	10	11	M
	Cond												
	S_1	9,4	7,8	6,2	0,0	5,6	1,2	0,0	8,4	2,0	0,0	0,0	3,7
1:st	S_2	10,0	12,2	7,2	5,6	7,2	6,4	3,0	7,8	3,0	6,0	0,0	6,2
day	S_1	10,0	7,2	4,8	0,0	6,6	1,4	1,4	10,6	1,2	0,0	0,0	6,0
	S_2	10,0	10,8	6,2	6,2	9,2	5,2	2,0	11,2	1,0	4,6	0,0	6,0
	S_1	---	12,8	9,4	0,6	---	4,8	3,8	---	2,8	1,2	0,6	4,5
2:nd	S_2	---	14,6	10,4	3,6	---	5,2	11,6	---	2,0	4,8	6,2	7,3
day	S_1	---	12,4	9,2	3,6	---	3,0	3,0	---	1,4	2,2	0,0	4,4
	S_2	---	13,6	10,4	5,2	---	4,6	6,6	---	2,4	4,4	2,8	6,3
	S_1	---	---	---	7,2	---	4,4	8,8	---	2,6	2,2	10,0	5,9
3:rd	S_2	---	---	---	9,6	---	3,0	9,0	---	2,4	4,6	11,0	6,6
day	S_1	---	---	---	4,0	---	2,4	8,8	---	1,2	1,3	9,6	4,6
	S_2	---	---	---	7,2	---	3,2	8,6	---	2,0	4,2	10,4	5,9

In the study about atypical behavior (Uneståhl, et al., 1971 f), mentioned earlier in this chapter, was also found that the duration of the ST was individually patterned. One S manifested progressively longer ST (10, 40, 90 seconds), another S showed long and short ST alternatingly (150, 15, 50 seconds) and a third S was observed to have progressively shorter ST (180, 120, 20 seconds). Anesthesia and amnesia lasted during the same interval.

In the study mentioned earlier on colour-blindness, the post-hypnotic effect was abolished by an anti-signal in the main experiment. However, in the pre-study with some susceptible Ss the signal was given on 6 different occasions with spontaneous extinction of the effect between.

On three of these occasions the duration of ST was also measured. Since the relation between ST and the posthypnotic effect will be discussed in the next paragraph I have chosen here to present a comparison of ST-duration and PHS-duration.

Occasion	ST-duration	PHS-duration
1	2,0 min	2,75 hours
2	5,5 min	15,5 hours
3	10,8 min	96 hours

This subject has manifested the longest ST-duration that we have found among our studies. She had a 12 SHSS-score and was very susceptible to hypnosis but since no clear relation between SHSS-score and ST-duration has been established in any previous study, the long duration in this case is perhaps due to the frequency of signal-repetition. Before the measures were taken, the signal had been given a number of times, always releasing the PHS, colour-blindness. On the three occasions when the effect was measured, an increase in duration of both PHS and ST could be observed, raising the question of a possible time-relation between ST and PHS.

ST AND THE POSTHYPNOTIC EFFECT

The posthypnotic phase can be divided into two periods; period 1 = ST and period 2 including the time from the termination of ST until the abolishing of the posthypnotic effect. The studies reported in this chapter have shown that period 1 is of very short durability, lasting only for a few seconds, while period 2 could last for hours, sometimes even days. An interesting question in this respect is whether the posthypnotic effect starts working already during period 1. In the study with the PHS about levitation of the left leg (Uneståhl, 1970 a), the five Ss showing both period 1 and 2, began the posthypnotic act already during period 1, i.e. while the anesthesia was still present.

Also in the study about atypical behavior during hypnosis the posthypnotic behavior appeared together with the ST immediately after the signal was given. In the study on PHS about anesthesia and hyperaesthesia, the spontaneous effect of ST (anesthesia) either worked with the PHS (S_1) or against it (S_2). The clear differences in the ratings of shock-intensity after S_1 and S_2 indicate that the posthypnotic effect also here has begun to work during period 1.

All our studies in this chapter have contained PHS of type 3, i.e. signal-released PHS. In the experiment on car driving (chapter VIII), where suggestions of type B 1 were used, no indications of any ST were found. The awakening seemed here to be followed directly by period 2, while the time-delayed effect of the B 3 - suggestion seems to need a new trance to start the effectuation of the sugges tion.

Erickson's findings concern mainly suggestions of type A. In the initial phase he observed certain changes in the individual's behavior whereupon the suggested act was executed. This was followed by an awakening and a continuing of the normal activity, mostly with amnesia for the post-hypnotic act.

This implies that the type A - suggestion is working only during period 1 and that period 2 never appears. Erickson does not relate whether he observed any direct limit between the initial posthypnotic phase and the elicitation of the post-hypnotic behavior.

This can be summarized in a schemata, which has been called "Uneståhl's paradigm".

PHS	Programming	Releasing	PHS are working	
Type	Containing	Effectuation	Period 1	Period 2
A 1	Certain act	Awakening	Occurs	Is missing
A 2-3	Certain act	Delayed	Occurs	Is missing
B 1	General state	Awakening	Is missing	Occurs
B 2-3	General state	Delayed	Occurs	Occurs

This schemata is still a working-model. However, more research is needed for a conclusive evidence.

A ST has in these studies been defined as the period followed immediately by the signal eliciting PHS, where the Ss manifesting a spontaneous anesthesia.

The time of anesthesia was mostly found to coincide with the time of amnesia and extended over a period during which the Ss also showed several of the earlier mentioned external signs of spontaneous trance. On one hand anesthesia seemed to be a good and objective criterion of the spontaneous trance that also gave a possibility to decide the duration of the spontaneous trance more exactly. On the other hand, it is not certain that the spontaneous trance always is accompanied by anesthesia. It can be assumed that the spontaneous trance in analogy with the original trance represents a continuum from zero to very deep. Anesthesia then appears somewhere on this continuum. Anesthesia is then not necessarily a criterion for spontaneous trance but the spontaneous trance is thus a necessary condition for anesthesia. Another possible explanation is the fact that anesthesia cannot always be registered at the initiation of post-hypnotic suggestions because the trance, in some cases, is of a too short duration to allow measurement of anesthesia.

ST has also important theoretical implications for hypnosis. Theories, explaining hypnosis mainly in terms of motivation and expectation in the S and experimenter (Barber et al., 1969) have difficulties in explaining ST, since it appears completely unexpected by the subject. The many years of hypnotic history before ST was detected and investigated also indicate that the phenomenon has been unexpected by the hypnotists.

A summary of this chapter emphasizes the following points:

1. During the effectuation of some PHS a peculiar mental state seems to appear.
2. Very few studies on the phenomena, called posthypnotic or spontaneous trance (ST) have been made earlier and were limited only to observational studies.
3. I have defined ST as the period following immediately after the release of PHS during which the S manifests a spontaneous anesthesia.
4. The period of anesthesia is mostly found to coincide with a period of amnesia.
5. In spite of some support for Erickson's reactivation theory the evidence from our data does not yield enough support to consider ST as a reactivation of the specific elements in the original trance.
6. The shortest and longest measurement ST in our studies have been resp. 2 sec. and 10.8 min. ST-periods lasting for more than 1 minute are rather unusual.
7. A tendency for the occurrence of longer ST-periods after a signal (releasing PH-effect) compared with that of the anti-signal (abolishing PH-effect) was found.
8. The posthypnotic phase can be divided in two periods, period 1 (= ST) and period 2 (end of ST - end of PH-effect).
9. Period 1 is of very short duration (often seconds) compared with period 2 (often hours).
10. The PHS begin to work already during period 1.
11. At type A - PHS, ST often seems to cover the whole act, i.e. period 2 does not appear.
12. At type B - PHS, period 1 is missing.

CHAPTER V. POSTHYPNOTIC SIGNALS

To release PHS by a signal is only one of the three ways of effectuating PHS as described in chapter III. A signal can be any stimulus, given signal value during hypnosis which then serves as a cue for releasing the effect. Since the hypnotic signals are interesting phenomena it is somewhat surprising to find that not a single study has penetrated this topic.

Any stimulus can be used as a signal, for instance words, meaningless syllables, shades of different colours, sounds of different pitch, motoric acts, behavior and even certain situations. It is not only possible to elicit different effects from different signals but also to vary the intensity in the effect by varying the intensity in the signal. If tunes are chosen for releasing emotions, different frequency can elicit different emotions and different amplitude can release different intensity of the emotion.

To prevent any unintentional releasing of the programmed effects outside the experimental setting we have adopted three procedures:

a) Chose meaningless syllables or words from an unusual language (Chinese, Sanscrit).
b) Limited the posthypnotic effect in time or room.
c) Abolished the programming of the Ss just after the experiment session.

Depending on the function of the signals I have separated two types; signals, releasing the PHS and antisignals, abolishing the PH effect. As was shown in the previous chapter the signals seemed to elicit a longer ST than the antisignals (table 4:).

In the pre-study with colour blindness (chapter IV) I detected that the S had amnesia for the signal word, why I decided to investigate this phenomenon further. As this case study was the first in an unexplored field, I will present a short summary of it.

Two words, "Ishihara" resp. "Atchivo", had been used to release the colour-blindness and the sentence: "You can now see all colours" to restore the normal colourseeing. After instructing the S to listen carefully and try to remember the words the experimenter mentioned the signal words slowly several times without any result. The S was told to try to read the lips, still with no result. She, however, understood everything clearly before and after the signal

the signal words.

With the S in another room, the experimenter wrote the signal word on a black-board together with some other words. When the subject was instructed to read the words written on the black-board, she could read everything except the signals. On questioning, she explained that she saw blank spots on the black-board. When the experimenter asked other persons, not connected with the experiment to tell and write the words for the S, the result was the same.

While the S was looking the experimenter wrote the letters "Ishihara" and "Atchivo". The S could through these movements understand every letter and repeat it aloud, but could not form then into a word. The board was still blank afterwards.

Among the trials with the signal sentence "you can now see all colours" should be mentioned that the S could see one word at a time, if the other words were covered. The S could also see "you can now see" if "all colours" was covered. The S experienced it as very strange that words "you can now see" could appear and disappear (depending on whether "all colours" was covered or not). If the S was concentrating on the first four words and the experimenter began to uncover the rest, letter by letter, the first words faded more and more and after uncovering three letters (in "alla") everything seemed blank. Applying the same procedures backward from the last letter in colours ("färger") the result was the same and everything disappeared after four letters were uncovered.

In order to find out if it was the structure or the meaning of the sentence, that was important, the sentence was translated to English and German. The result was the same as in the original Swedish sentence, thus indicating that the S was blocked for the meaning and not for the words in themselves. After abolishing the programming during a new hypnosis, the S had no difficulties in repeating or reading the words.

The first exploration was followed by many similar case studies with other subjects. (Here are a few examples).

One S was instructed to read aloud a certain text which included the signal word. She read fast, correctly, and without hesitation the first part of the story. Half-way through three lines above the signal word she sounded uncertain and the reading went on slowly

until the signal word, whereupon she stopped, One test showed that she was colour-blind and also anesthetic. Thus the trance seemed to start rather long before she reached the signal word, which she never pronounced.

The signal word "Atchivo" was taken from a Russian folksong. A trial with another subject showed that the posthypnotic effect was released while the S was listening to a tape with this song, in spite of the fact that the word was not heard very clearly.

Another S was unprogrammed and tested that the signal word had no effect. Some weeks later the S was asked if she still remembered the signal word, which she did not. The experimenter then gave the signal with the consequence that the posthypnotic effect was released again. A new programming was made and the S received instructions to remeber and repeat the word. The signal word was later given to the S on many occasions witnout any effect. Evidently a spontaneous recovery of the signal value of the word had occurred. Keeping the word at a conscious level seemed to prevent more recoveries.

More about blocking, especially "suggested blocking", will be discussed in the next chapter.

GENERALIZATION AND DISCRIMINATION OF POSTHYPNOTIC SIGNALS (Unestähl, 1971 a).

The study was aimed to investigate:

1. The generalization effect between a signal-tune, programmed under hypnosis to release a posthypnotic suggestion, and other tunes.
2. The discriminative ability of tunes in hypnosis and waking.
3. The blocking effect of the signal tune.
4. The effect of different expectations about the duration of posthypnotic suggestions.

METHOD

14 subjects with susceptibility-scores between 8 and 12 points on SHSS, form A, participated of these, 10, in the main experiment. The signal was a 800c/s-tune with a duration of 2 seconds. The posthypnotic response was 20 cm armlevitation. The discrimination ability was investigated through a series of tunes with differences from 0 to 100 c/s. Half of the group was told in advance that posthypnotic suggestions (about for instance arm levitation) usually

work for 10 seconds, the other half of the group were told that the posthypnotic suggestions will work for 10 minutes.
All the instructions, the induction of hypnosis and the test were given by a tape recorder.

RESULTS AND DISCUSSION

Table V:1

Number of presentations (in 10 Ss)	TEST-TUNES c/s	Number of responses (armlevitation)	Percentages of responses (armlevitation)	Durations (sec.) of p.h. response mean	Amplitude (cm) of p.h. response (mean)
10	400	0	0	-	-
10	500	1	10	10	2
10	600	1	10	4	2
10	700	1	10	2	1
10	725	2	20	10	1
10	750	1	10	7	1
10	775	1	10	2	1
10	787,5	2	20	20	3
50	800	8	16	22	12
10	812,5	3	30	5	7
10	825	1	10	8	35
10	850	1	10	5	40
10	875	0	0	-	-
10	900	1	10	3	30
10	1000	0	0	-	-
10	1100	1	10	1	1
10	1200	0	0	-	-

Five out of the ten Ss responded with the posthypnotic suggestion, but none of these five Ss responded every time the signal was given. As can be seen from table V:1 they also responded to tunes other than the signal.

It is difficult to see any consistent line in the responding, and therefore the question about generalization can not be answered. No relation has been found between the duration and the amplitude of the posthypnotic responses. A comparison of armlevitation as a hypnotic and a posthypnotic response showed a smaller amplitude of the response as a signal-released posthypnotic response. The results indicate that a response to the control suggestion under

hypnosis is a necessary but not a sufficient condition for response to the posthypnotic suggestion.

The results concerning the second question showed no differences in the ability to discriminate tunes in the hypnotic and waking state. No clear evidence of any blocking to the tune-signal was found. Of the five Ss, responding to the posthypnotic suggestion, three received the pre-information about 10 minutes duration of posthypnotic suggestions. They had an arm-levitation response with 14,2 sec. duration (mean) compared with 2,2 sec. (mean) for the two Ss, who got the pre-information about 10 seconds duration of posthypnotic suggestions.

The assumption that posthypnotic suggestions of this kind will only be released if the Ss have amnesia for the given suggestion has not been confirmed in this study. Of the five Ss, responding to the posthypnotic suggestion, three had complete amnesia, one partial amnesia and one no amnesia at all. Besides one subject had complete amnesia but with no response to the posthypnotic suggestion.

RECOGNITION THRESHOLDS FOR NEUTRAL WORDS AND SIGNAL WORDS (Uneståhl et al., 1970 b)

The two main questions for this study were:

1. Changing a neutral word to a signal word, will this alter the recognition threshold of the word?
2. Is it possible for a signal word on a subliminal level to re-

METHOD

Eight nonsense words were used with vocal and consonant changes in randomized order. Two were made into signals, two were control words, which like the signal words were presented under hypnosis and the rest were neutral words presented only before and after hypnosis. The posthypnotic suggestion (PHS), to be released by the signal words, was one inducing red-green colour-blindness. This was chosen because it is easy to control the effect of every word, shown on the screen and because colour-blindness is difficult to simulate. Together 16 different colours were shown and rated. Besides recognition threshold and colour rating, GSR was measured. 9 Ss took part in the experiment.

RESULTS AND DISCUSSION

Table 5:2

	Mean, 9 subjects	
	Before hypnosis	After hypnosis
S_1	16,81 ms	15,81 ms
S_2	18,89 ms	16,00 ms
C_1	16,44 ms	16,66 ms
C_2	16,66 ms	16,96 ms

Table 5:3

	Mean, 9 subjects	
	Before hypnosis	After hypnosis
Sm 1+2	17,85 ms	15,91 ms
Cm 1+2	15,81 ms	16,55 ms
Nm 1-4	17,64 ms	16,67 ms

No significant differences reached (Wilcoxon)

S = signal word (S_1 = sibaha S_2 = nefefe)
C = control word (C_1 = elyvov C_2 = rybyda)
N = neutral word

The recognition thresholds of both signal words were lower after hypnosis, i.e. after they had got signal value. For the control words the change goes in the opposite directions.
The neutral words have after hypnosis a somewhat lower threshold but they were not like the signal words and the control words given under hypnosis (no significant changes).

Regarding PHS six of the subjects reacted on one or more occasions with colour blindness to S_1. Three of these Ss reacted on all three occasions as S_1 was given. For two of the Ss the normal colour seeing always returned when S_2 (the anti-signal) was given.

In all six of the reacting subjects, PHS was released or terminated by a signal word at a subliminal level at least once. In two of the Ss, S_1 and S_2 worked at a subliminal level in 5 of the 6 presentations. In 2 Ss a control word was functioning as a signal word, also at a subliminal level. In one subject colour-blindness was induced by S_1 at a subliminal level, but the normal colour seeing was restored when S_1 reached threshold level. In some cases it was possible to see very clear reactions in GSR-recordings when the signal words were presented at a subliminal level.

COMMENTS

One of the studies (1969 a) gave some new evidence that the stimuli which receive signalvalue in the hypnotic state may give an auditive and visual blocking for the signal in some subjects. These

subjects also generalized the blocking to similar words and sound-combinations. A study (1971 a) using tunes as signals did not show the same blocking effects as with signal-words.
Another study (1970 b) showed that the recognition thresholds tended to be altered, when previously "neutral" words were given signal value, i.e. were able to release posthypnotic suggestions. Compared to control words presented immediately before the signal words in hypnosis, but of no signal value, the thresholds of the signal words were considerably lowered.

The kind of posthypnotic signal and the way it has been presented did not influence proper posthypnotic behavior. Words, (nonsense syllables) tunes and gestures as signals have been used. One experiment (1974 c) has shown that even a hallucination can serve as a signal. The signal has been presented alone or more or less embedded in some context, for instance one word in a chinese song. The signal has been given by the hypnotist or by some other person not connected with the experiment. The signal has been delivered by tapes and records or in written messages. All these variations has been made without any noticable differences in efficiency.

The possibility of using human behaviour as signals which will release emotions, serving as reinforcers of the behaviour, will be shown in chapter VII.

This chapter has shown:

1. No study has been made earlier concerning the nature of posthypnotic signals.
2. Any simple or complex stimulus, behaviour or situation can receive signal value during hypnosis and serve as a cue, releasing posthypnotic effects.
3. No difference can be seen in effect if the signal is given by the experimenter or by a person, not connected with the experiment.
4. Stimuli given signal value can cause in some Ss a spontaneous, auditive and visual blocking of the signals.
5. Various procedures to abolish the blocking have been tried without results. The only effective procedure seemed to abolish the signal value of the stimuli.
6. The blocking at meaningful stimuli, receiving signal value, seems related to the meaning and not the structure of the stimuli.
7. No difference in the ability to discriminate tunes in the hypnotic and waking state was found.
8. Recognition thresholds were lowered when previously "neutral" words were given signal value.

CHAPTER VI. POSTHYPNOTIC BLOCKING SUGGESTIONS

A.S. Peterson et al. (in Lassner, 1965) have studied the blocking of neural transmission by suggestion under hypnosis. In the first experiment they investigated if it was possible to condition the individual in spite of a suggested anaesthesia. No fear reaction developed which indicates that there is a definite block of the neural impulse at some point between the skin and the cerebral cortex. In another subject who had been conditioned and who had then been made deaf for CS+ no fear reaction occurred in response to CS+. An audiogram showed that he was unable to hear tones which were adjacent to the tone for which he had been made deaf even if he increased the amplitude to 67 decibels.

In order to investigate if the block was situated on the afferent side, in the cortex or on the efferent side, an experiment was devised in which deafness to a specific tone caused an acceleration of the heart rate. They presented a pattern of three specific tones each lasting a second, followed by a second of silence, followed in turn by the painful shock. However, when the sequence of the same three tones was followed by a very light tone, no shock ever occurred. The second of silence, which indicated that a shock would occur, was replaced by a high pitched tone, which indicated that no shock would take place. When, therefore, the subject was made deaf by hypnosis to the high pitched tone, the negative conditioned stimulus was replaced by a subjectively experienced moment of silence, which indicated for the subject, the positive conditioned stimulus, and so there was an increase of heart rate. Thus, there cannot be any inhibition or functional paralysis of the sympathetic.

Since it appears that the inhibition is not on the efferent side, they devised a new experiment to establish whether the block was in the cortex itself, or on the afferent side. For that purpose, they measured "the average evoked response" to an auditory

stimulus. The apparatus recorded a change of potential in the auditory cortex when the subject was paying attention to the clicks, but not if he is ignoring the clicks. There was no evoked response when the subject was suggested not to hear the sound.

Thus, the stimulus does not reach the cortex, why the inhibition is probably on the afferent side. Hypnosis seems to cause a block in some sub-cortical center, probably in the cochlear nucleus, which prevent the impulse from the auditory signal from passing beyond the cochlear nucleus to the cortex.

Blocking is one form of amnesia, which can be either spontaneous or suggested. According to Hilgard (1965) one can distinguish between a) posthypnotic amnesia for events within the hypnotic session, b) posthypnotic amnesia for the results of learning within the session c) posthypnotic source amnesia, i.e. a retention of material learned within the trance, with forgetting of the fact that it was learned and d) amnesia within the trance for earlier events within the trance, while the subject remains hypnotized. Blocking then implies another type: amnesia for a function, learned before hypnosis or an event which happened before the hypnotic session.

Evans (1973) made a preliminary study to find out what happened when the Ss were blocked for a figure. Complex mental processes seemed to appear. One subject wrote the answer with Roman numerals, another subject had to write with both hands. Evans thought that the Ss used one of two different strategies.

a) the logic strategy - the Ss try their best in a difficult situation.

b) the blocking strategy - a cognitive blocking, a denial of the meaningful existence of the figure.

Evans found that simulating Ss often use the logic strategy, while hypnotized Ss use the blocking strategy.

Before beginning a more systematic investigation I had encountered the phenomena of 'blocking' in several other experiments. In some studies (Uneståhl, 1969 a and b) a blocking-type of PHS (colour-blindness) was used, where the longest duration of PHS of this type was illustrated i.e. 2 weeks blocking of the counting ability without any spontaneous recovery.

The blocking, described in the former chapter, was of a different type i.e. spontaneous and not as a result of suggestions. They functioned as negative hallucinations both in the auditive and the visual areas and were mostly connected with the signals of verbal character. In order to investigate further the phenomena connected with the blocking, a special experiment was devised.

INVESTIGATION CONCERNING POSTHYPNOTIC BLOCKING (Uneståhl, et al. 1974).

From the prestudies ought to be mentioned that 2 Ss exhibited armlevitation to the signal of counting 1 - 10 in Swedish. They also showed the same response, but to a lesser degree when the experimenter was counting in English and to a still smaller degree when he was counting in German. As was shown in the previous chapter, the meaning of the signal seems to be the important thing.

For the 2 Ss, to whom the figure and the concept seven was suggested to disappear at the signal "beautiful", the figure disappeared before the signal was given, perhaps in connection with the first signal, counting to ten. Possible explanations: The Ss might have misunderstood the instruction, a confusion between the two signals could have occurred or the Ss were so prepared (unconsciously) on the suggestion that it was effectuated in advance.

In the prestudies a post-hypnotic hallucination was also found to function very well as a signal for a post-hypnotic behavior. It was also found that the signal and the post-hypnotic behavior can be the same thing, but no blocking of or amnesia for the signal could be detected.

METHOD

In the main experiment 10 Ss received the PHS that the figure and the concept 6 (in Swedish 6 is the same as sex) would disappear when they heard the signal, which was 8. The nature of the blocking and the possibilities of abolishing the blocking (intensive stimulation, increasing of motivation etc.) was investigated during test-period I. Electric shocks were also administered in connection with the presentation of 6 and 8, and the Ss had to estimate the shock intensity compared with a standard shock, given before hypnosis I.

The first part of the test period I after the signal "8" had been given was concerned with checking of the blocking. The first tasks were as follows:

1. Count loudly 1 - 10 in Swedish
2. Count loudly 1 - 10 in English
3. Count loudly 1 - 10 in German (alt. French)
4. Write 1 - 10 with Arabic numerals
5. Write 1 - 10 with Roman numerals
6. Read a text (containing words like sex, Essex, sixteen, sexton, sextant, sax, etc.)
7. Counting of the fingers
8. 11 counting tasks (like 1+5, 4+4, 18:3, 48:8, 8x8 and so on)

During hypnosis II the Ss were investigated whether they could write the figures from 1 to 10 with automatic writing, and if they could count from 1 to 10. They were also asked to describe how they felt during test period I, with the help of automatic writing.

During hypnosis II some new PHS were also given. If the figure 6 was still blocked, an anti-signal "12" was given, to be presented after awakening. Another PHS was that the figures 2 and 9 should disappear after awakening. The disappearance of 2 was associated with a negative feeling and 9 with a positive feeling.

During testperiod II a personality inventory (EPI) was administered. The Ss were then tested one every half an hour to see when the blocking of 2 resp. 9 ceased.

RESULTS

It was found, in accordance with the pre-studies, that 2 Ss manifested the posthypnotic effect already before the signal had been given. In these cases the release of the effect may have been due to the fact that the Ss were exposed to figure 8 on the rating scale, which preceded the control of "spontaneous" blocking.
The effect of the signal released PHS was as follows:

1) 3 Ss manifested no blocking at all
2) 2 Ss had partial blocking
3) 5 Ss showed complete blocking

As the investigation concerned the phenomena of blocking, the first group did not go through the rest of the experiment procedure. An overview of the results can be seen in table VI:1.

In group 3 there were some differences, 3 Ss could for instance neither utter nor repeat 6, 2 could repeat but still did not know the meaning of 6. The inability of even repeating can be compared with the description of blocking in the previous chapter. However, there the blocking was for the signal while here for the PHS. 4 of the 5 in the third group showed complete blocking not only for "sex", but also for homonyms and synonyms, the 5th person only for homonyms.

The prestudy shows that the blocking also covers the PHS in other familiar languages although to a somewhat lower degree (one subject less). On the other hand no sign of any spontaneous blocking of the signal word 8 was found, neither in the repeating, counting or writing performances.

Intensive stimulation of the figure six and increasing motivation were tried in order to try to abolish the blocking. The 5 Ss were promised 10 - 100 Sw. crowns if they could find out which figure was missing. None succeeded and some Ss even remarked that the increased effort made it still more difficult to find the missing part. No effect was obtained by having the Ss listen to a tape-recorder where different persons repeated "six" with different speed and pitch,

Table VI:1 Results

	No. of Ss tested	Positive reaction No. of Ss	"ambiguous" results No. of Ss
6 disappeared before the signal given	7	2	
6 disappeared in due to the signal	7	5	2
Were able to repeat the signal (8)	7	7	
Count to 10, omitting 6 in English	7	4	2
Count to 10, omitting 6, in German or French	7	4	2
Write to 10, omitting 6	7	4	
Intensive stimulation of 6, blocking abolished	7	5	2
Increased motivation to find the missing figure (money offered), blocking abolished	7	5	2
Know what "sexual" means	7	3	
6 retrieved while counting under hypnosis	6	3	
6 retrieved while writing automatically	5	3	
Blocking of 6 abolished before the antisignal (AS)	4	2	1
Blocking of 6 abolished after writing the AS counting task	4	3	
Blocking of 6 abolished after the AS given by the experimenter	2	1	
9 and 2 blocked	7	5	2
9 and 2 associated with emotions	7	5	2

Ss	1	2	3	4	5	6	7
Reading a text containing 8 critical words. No. of words read	2	3	3	7	8	8	8
6 counting tasks with 6 involved Number missed	5-6	5	6	6	6	2-3	5
Counting fingers: results	11	11	10-11	10	11	10	10

or by giving the Ss a typewritten paper filled with figures of sixes. Even here the Ss had some difficulties in focusing on the separate figures, the figures seemed to float. On further questioning the subjects explained that instead of figures they saw "curles", "pipe-bases", "music-symbols". On turning the page upside-down all Ss were able to identify the figures as 9 without any difficulty. Two other tasks were to draw a big "6" and a face of a man, containing sixes. The results of these tasks were that the Ss more or less distorted the drawings as can be seen in figure VI:1.

During this first test period, lasting for half an hour, the blocking did not cease for any of the Ss. Instead one got the impression that the blocking at the end of test period I was still stronger for some Ss than in the beginning, perhaps because the Ss were more aware and embarrassed of the blocking after having tried many methods and much conscious effort to get rid of it. The Ss were subjectively ranked in the beginning and the end of testperiod I according to the "depth" of the blocking. A correlation between these two rankings showed $r = 0.75$ (Spearman rankcorrelation).

Electric shocks were given on various occasions during testperiod I and the Ss had to rate the shock intensity compared with a standard shock (5) given before Hypnosis I. To be able to compare the ratings two control groups were tested in a similar way. Controlgroup I (CI) was only rating shocks during 40 minutes, while the other control group (CII) was hypnotized in the same way as the experiment group (E) but without any other PHS than amnesia. After hypnosis they had to estimate shocks in the same way as E and CII. The results of some estimations can be seen in figure VI:1.

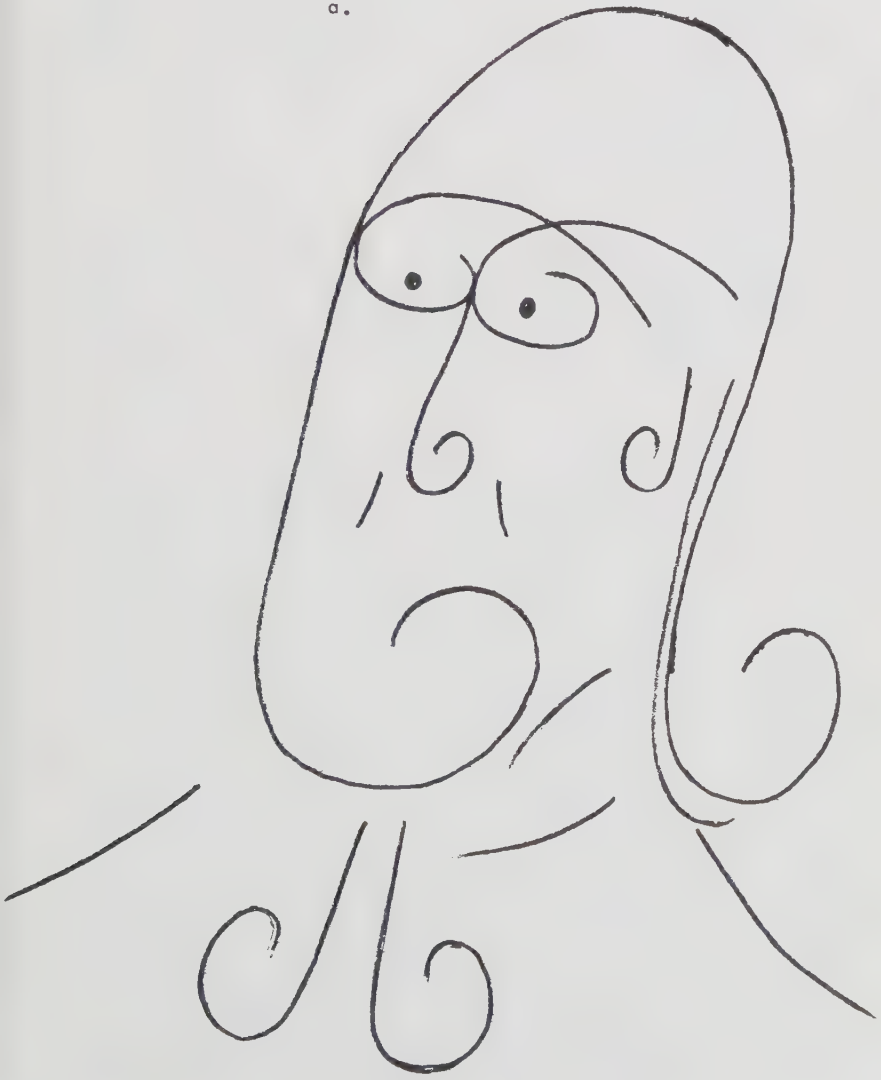
The slow decline of the estimated values for CI is probably due to habituation, while the trend in the opposite direction for CII may be due to a gradual decrease of after-effects from the hypnotic trance. The strong decrease in estimated values for the ex-

Figure VI:1 Drawing a face of a man, containing sixes.

a. The original picture

b. Pictures drawn by 3 of the Ss (back).

a.



b.

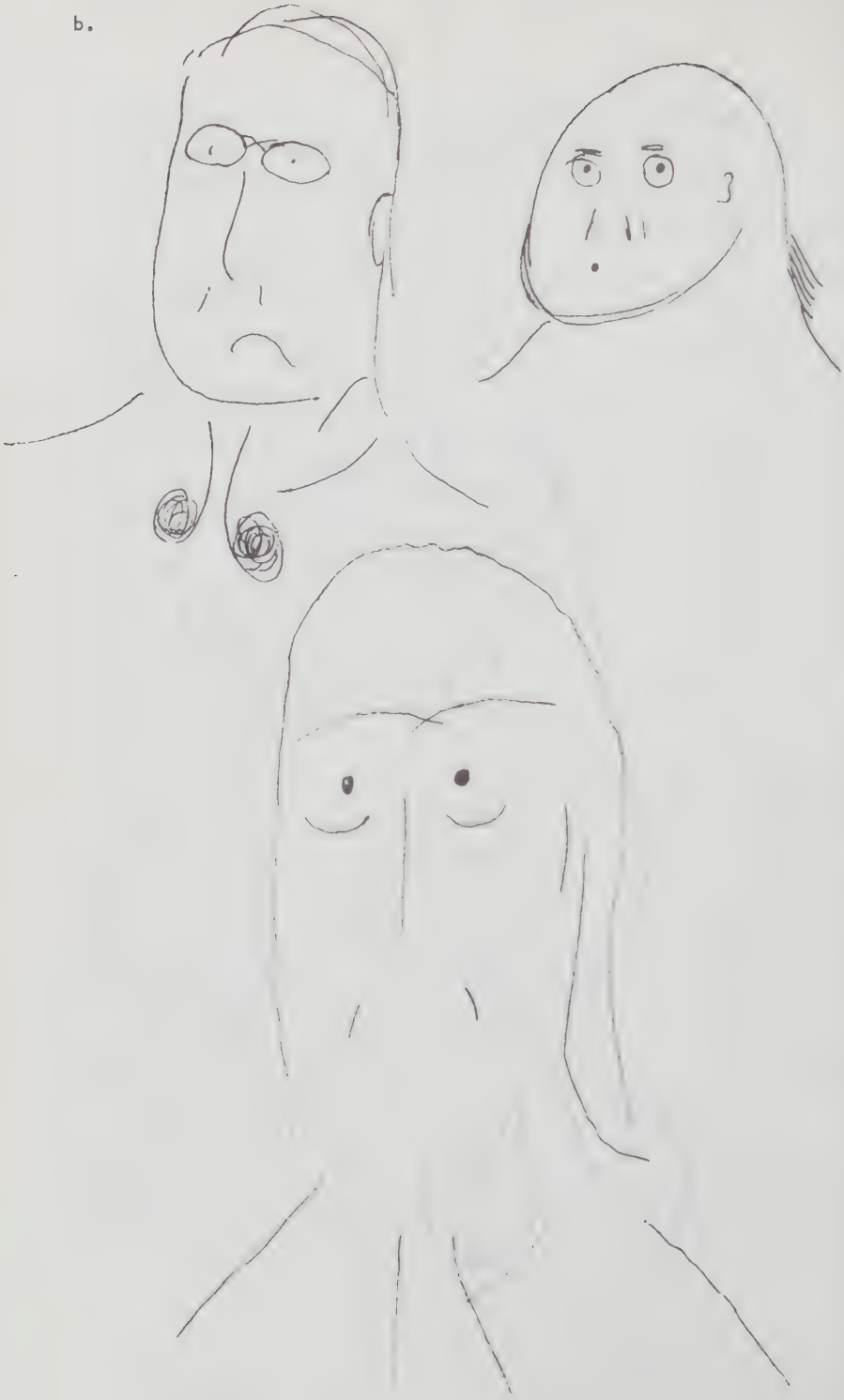
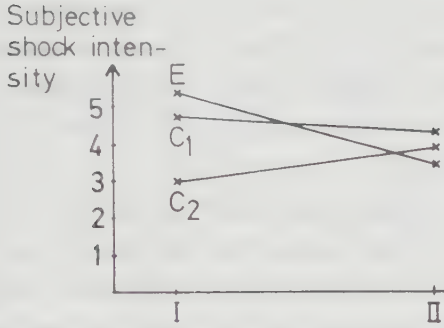


Figure VI:1



Comparisons of rated shock intensity between the experiment group-E (hypnosis+PHS) and two control groups, C_1 (no hypnosis, no PHS) and C_2 (hypnosis, no PHS).

I = the first two ratings
II = the last two ratings

periment group may indicate an increasing involvement and detachment due to the effort of finding the missing figure. 2 Ss did not feel the shock at all on some occasions mostly in connection with the signal (8).

During Hypnosis II the Ss were anew urged to count to ten, and here 3 of 6 Ss left out the "six-figure". The method of automatic writing was therefore tried. Automatic writing is intended to be one expression for the unconscious mind. Thus a dissociation was created in the right arm, whereupon the Ss were given suggestions that the hand should move of itself without any steering from the Ss; the spontaneous movements should form the figures from 1 to 10 and also describe their feelings during the test period I. The intention of the last task was to see if this description gave more or different data compared with the ratings in testperiod I. 5 Ss described their feelings in a legible way but the descriptions were in agreement with the earlier "conscious" ratings. 3 of these 5 Ss managed also to produce the figure 6 in the automatic writing, which gave some support to the hypothesis that a method, where no conscious effort is involved, is more effective in breaking the blocking.

Before waking new PHS were programmed. For those Ss, still being blocked, the figure "12" was given signal value with the inten-

tion to take the blocking away (anti-signal). A new post-hypnotic blocking should, however, occur, this time for the figures 2 and 9. In order to investigate further the possibilities of influencing the spontaneous return of the blocking figure, the blocking of 2 was associated with a feeling of well-being and the blocking of 9 to a feeling of inconvenience.

Testperiod II began with counting to ten. For 5 of the 7 Ss the blocking of 6 was gone i.e. already before the anti-signal had been given. For the other 2 Ss the anti-signal (12) was given as the answer of a counting task (7+5), given to the Ss. One of the two Ss managed to reach the figure 13 (remember that figure 2 was now blocked) and the experimenter had to administer the anti-signal verbally. The second subject broke the blocking of 6 by writing the answer 12, but it had also the effect that the blocking of 2 was abolished.

All seven Ss, with an earlier complete blocking of 6, received also complete blocking of 2 and 9 after the second hypnosis. The ratings of the feelings for the two "meaningless" figures also showed that the programmed feelings were working. The hypothesis that the blocking of 9, which meant wellbeing, should stay longer than the blocking of 2, was however, not confirmed. Instead the figure 9 returned first for somewhat more Ss than the figure 2, while one subject got them back at the same time. Both figures had returned for all Ss within 2 hours.

The results of the personality inventory must be interpreted with reservation due to the small sample. The degree of blocking correlated -0.33 with Extraversion, -0.66 with Neuroticism, and +0.44 with the Lie-scale (Goodman-Kruskal's gamma). These interesting tendencies are worth further investigations as they indicate the possibility of significant relations between personality factors and single hypnotic phenomena instead of the lack of significant correlations to hypnotic susceptibility as a whole.

DISCUSSION

Of the 10 Ss, 5 Ss received complete and 2 Ss partial blocking for the figure 6 after the first hypnosis and for the figures 2 and 9 after the second hypnosis. Normally the blocked Ss seem to lack initiative to get rid of the blocking but during test period I the experimenters activated the Ss and different methods of breaking the blocking were tried. All this effort, however, seemed to have an opposite effect i.e. a strengthening of the blocking. It also had the effect that the Ss felt more uncomfortable. The ratings of the strongest unpleasantness were made during the trial to break the blocking with increased motivation (offering the Ss money, if they could find the missing figure). All Ss became aware that something was wrong. Some described the missing as "very close", "on the tip of the tongue", "in the mouth", but as soon as they had to concentrate on it, it disappeared. Test period II, with the figures 2 and 9 missing, was not rated as so inconvenient, as the Ss could ignore the blocking if they wanted. There the figures also came back spontaneously after a while. The relationship to effort can also be illustrated by two of the Ss who mentioned the missing figures "by mistake" in connection with telling their post-number and birth-number.

The blocking of figure 6 was to be elicited with a signal (8) and abolished with an anti-signal (12). Some Ss received the intended effect already before the signal or anti-signals were given which may have to do with a misunderstanding of the instruction, a strong "inner preparedness" for the coming effect or that something else served as a signal (for instance figures in the rating scales).

Electric shocks were given on various occasions during test period I, in order to indicate any eventual spontaneous trance. Only 2 Ss did show signs of anaesthesia on some occaions, mostly in connection with the signal, but the estimation values for the

experimentgroup, compared with the controlgroups (figure VI:1) may indicate increasing involvement and detachment during the test period. Some Ss reported a feeling of detachment in connection with the effort to find the missing figures and one subject rated the trance quality of test period I (more effort) as 25, and test period II (less effort) as 10 on a scale going from 0 to 100 (deep trance). Some Ss had also, during test period II, partial amnesia for the whole test period I. These observations can be discussed in relation to "Uneståhl's paradigm" (chapter IV), where PHS of type A seems to be performed in a trance state, while PHS of type B3 only has indications of trance at the initial onset i.e. ST is there only an auxiliary mean for eliciting the onset of the post-hypnotic effect.

The fact that 3 Ss managed to write 6 during automatic writing, where the right arm is detached from the rest of the body and is moving spontaneously, is in agreement with the other findings that conscious effort strengthens the blocking. On the other hand no support was obtained for the hypothesis that a blocking associated with a positive feeling should have a longer duration than the negative one. The result showed rather a tendency in the opposite direction, which may be explained of that a blocking, associated with a negative feeling, creates more irritation and voluntary effort to break it, which in turn has the opposite effect.

The relation between the personality inventory (EPI) and the tendency for blocking showed some interesting trends, which ought to be investigated on larger populations. The blocked Ss had lower neuroticism scores compared with the non-blocked Ss (sign. $p\ 0.05$) and also compared with the normal population (sign. $p\ 0.01$). The hypnotic susceptibility as such has been related to all various personality factors but since no significant correlation could be found it is high time to start relating personality and other factors to single dimensions in the hypnotic susceptibility.

The relationship of post-hypnotic blocking to perceptual defense will shortly be discussed. "The theory of repression" is hardly applicable, since we always used rather neutral stimuli and responses both as signals and PHS. One possibility is, however, that the programming during hypnosis means giving the "neutral" stimuli a positive or negative emotive meaning. One argument against this is for instance that blocking of signals can occur even when they elicit positive effects. The blocking of 9, in this experiment associated with a positive feeling, was still effective.

For the same reason "the theory of ego defense" can hardly explain the phenomena of hypnotic blocking. However, the 2 Ss with the strongest blocking at the end of the test period, also had the highest score on the variable "Extraversion", and the two Ss who tried mostly to reason logically had both 4 on the Stanine scale, which should be in accordance with the "theory of ego-defense", that the reaction to incongruence in perception might be either repression (extroverts) or intellectualization (introverts). However, the sample is too small to permit any conclusions in this respect.

The theories of dissociation especially in the form of the neodissociation theory of multiple cognitive control (Hilgard, 1973) seem to be better applicable to the phenomena of blocking than the theories of perceptual defense. The blocked figure disappears from the mathematical cognitive structure and then floats between different levels of consciousness.

This chapter has shown:

1. Besides the spontaneous blocking, shown in chapter V, it is possible to induce blockings of specific or general abilities with the help of PHS.
2. Posthypnotic blockings, bound to a signal, are sometimes released even before the signal is administrated.
3. The blocking can be complete or partial and may become evident in phenomena such as resistance or repulsion against the figure.
4. The blocking also covers the figure in other familiar languages.
5. The blocking may also manifest itself in the inability to repeat the blocking figure.
6. The Ss could perceive the blocking figure, sometimes with some resistance but do not interpret it as a number.
7. In drawing a big 6 or a face containing sixes the Ss distorted the drawings.
8. Intensive stimulation of the blocking figure or increasing motivation (offering money) does not abolish the blocking.
9. Increased effort in order to find the missing figure rather tends to strengthen the blocking.
10. Increasing awareness of something missing and increasing effort to find it increase the unpleasantness in the Ss.
11. Performance with very little conscious effort involved, like automatic writing, sometimes managed to break the blocking.
12. Indications for relations between the tendency of blocking and some personality factors were found.
13. The phenomena of blocking may be better explained by theories of dissociation rather than by theories of perceptual defense.

CHAPTER VII. POSTHYPNOTIC SUGGESTIONS AS REINFORCERS OF BEHAVIOR

Thorndike was the first investigator of the effect of reward on learning, resulting in the formulation of the wellknown "law of effect". His successor Skinner, founder of "Non-mediational theory". claims that "behavior is shaped and maintained by its consequences." If we realize this then we can study behavior that operates upon the environment to produce consequences ("operant behavior") by arranging environment in which specific consequences are contingent upon behavior. We can also manipulate the environment, which often has dramatic effects.

Skinner claims that the reinforcing effects of reward occur automatically, independent of the subject's awareness of the relation response - reinforcement. Results supporting the automatic effect of reinforcement have been presented by Marx (1967), Postman (1965) etc., while other researchers, like Dulany and Spielberger (1966), do not support the law of effect. Bandura claims that learning without awareness is possible but such learning proceeds slowly. An aware symbolic representation of the relation response - reinforcement will accelerate the learning and to a great extent influence the overt behavior. Bandura refers to an experiment by DeNike, showing quick and dramatic changes in the speed of learning as soon as the Ss realized what was reinforced.

The treatment with operant techniques has mostly been applied to children and psychotic patients with the intention to develop new response patterns. Among those who critisize these techniques are Murray and Jacobsson (1971) :

> "It is likely that response shaping and chaining under conditions of positive and/or negative reinforcement are highly efficient methods of teaching withdrawn, sometimes non-verbal institutionalized patients. However, with the greater majority on non-institutionalized patients, we could expect that instruction and modelling are more efficient methods of converging information and

changing behavior."

Skinner in his methods of operant techniques has mostly used external reinforcers, primary like food and sweets or secondary like "tokens" of different kinds. Cautela, on the other hand, has constructed a method with internal reinforcers, called "Covert Reinforcement." He tried first with aversive stimuli presented in imagination via instruction and found that they had properties similar to an externally applied stimulus. In the same way he found later that reinforcing stimuli functioned in a similar manner when presented in imagination as when externally applied. The first step is to find reinforcing stimuli, which here consist of previously experienced pleasant events and situations. Cautela's methods are to a high degree based on the subject's capacity for imagination and involvement. The description of the "situation" at the therapy session has a very suggestive character in order to create strong emotions. Cautela's methods have apparently many features in common with hypnotic methods, and it is likely that "covert reinforcement or desensitization" in many Ss creates a state, which can be defined as hypnosis.

Skinner's techniques with external reinforcers have som disadvantages, for instance the administrative difficulties as the methods presuppose a rather strong control of the environment. The persons in the patient's surroundings have to know what behavior is going to be rewarded, they must observe, be consistent, react quickly with the reward, vary the reward etc. These techniques are hardly applicable to all individuals. Also Cautela's methods involve some problems in demanding a great deal of the subjects' willingness to participate actively, and a good imagination ability is also necessary.

Thus, the question arises if hypnotic techniques can be used to remove some of these difficulties. From previous chapters is known that general states like emotions can be released posthypnotically. It is also known, that the releasing can occur through a

signal (PHS of the type B3). In chapter V it was explained how a certain behavior can be given signal value during hypnosis and then serve as a cue, eliciting the programmed effect.

Two experiments have been carried out to investigate if such a hypnotic technique can be used in modifying.

EXPERIMENT I: A POSTHYPNOTICALLY RELEASED EMOTION AS A MODIFIER OF BEHAVIOR (Uneståhl et al., 1971 a).

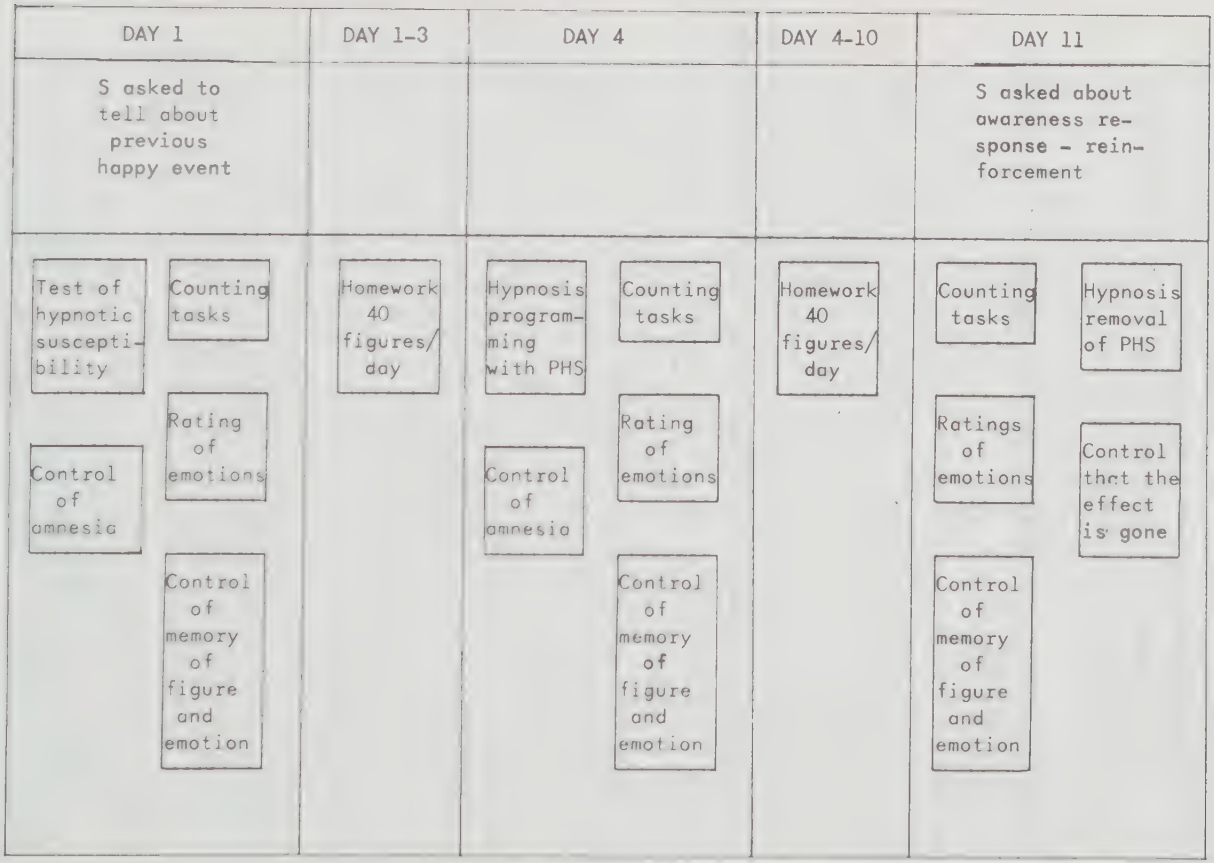
METHOD

Seven susceptible subjects, SHSS-scores = 12, participated in the study of a 2 weeks' duration. On the first session the Ss were asked to narrate a happy event experienced in the past. They also solved 30 very simple counting tasks, the answers to which were arranged so that every figure between 0 and 9 was written three times. After every answer the Ss rated their feelings on a variable of discomfort - wellbeing and with steps similar to those in the scale for subjective experience analysis, used in earlier experiments. After the first meeting a control period of three days followed, where the Ss had to write forty numbers from 0 to 9 every day. The Ss should write them with twenty seconds' interval and always choose the first number he was thinking of. In this way the Ss' "normal" preference of writing numbers between zero and nine was obtained.

The fourth day when the Ss came back to the laboratory they were hypnotized and had to revivify this happy experience they told about at their first visit. They were then told to forget the event but still keep the sense of happiness, whereupon the feeling was programmed to one of the subject's low-frequency number. Thus, the PHS was: "Every time you write the number you will feel as happy for fifteen seconds."

After awakening and after a control of the suggested amnesia the Ss had to count the same tasks as at the first meeting and also rate their feelings after every number. During the following

Experiment I - Timeaxis

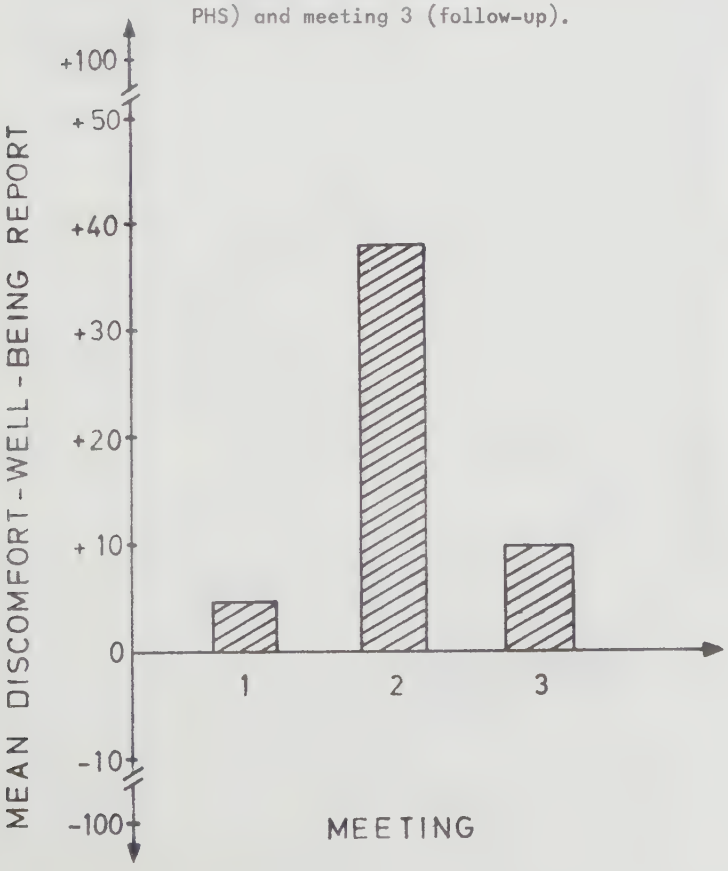


week the Ss then had the same kind of home-work as during the control-period. On the third meeting at day eleven they made the counting tasks again, whereupon the PHS were removed. An interview with the Ss terminated the experiment.

RESULTS

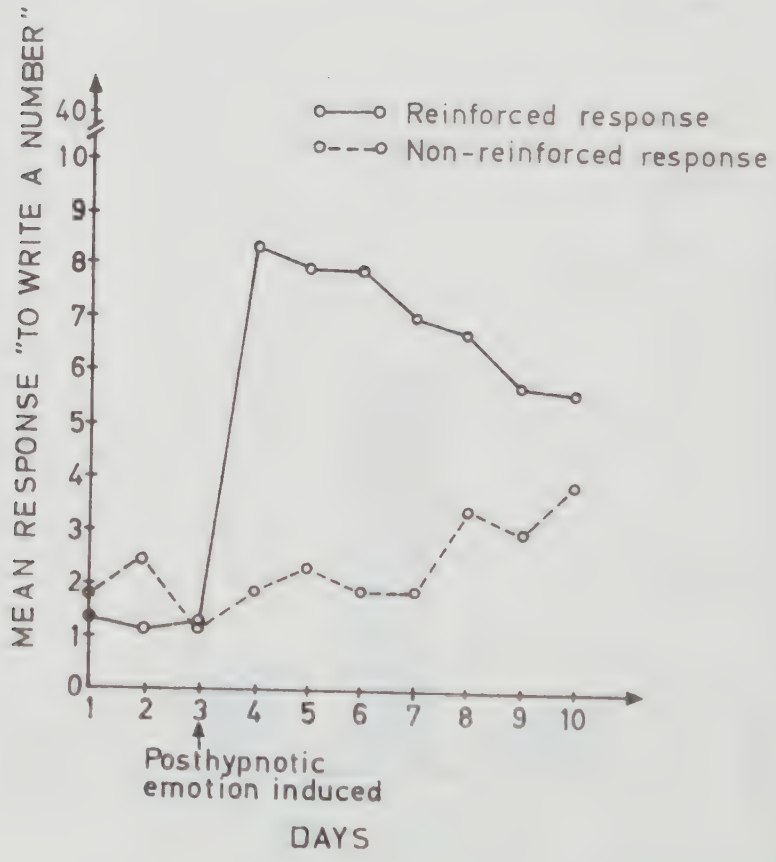
There was a significant increase ($p = 0.008$, sign. test) in rating of well-being after writing the "critical" number at the second meeting compared with the first (figure VII:1).

Figure VII:1 Reported discomfort - well-being after writing the critical number at meeting 1 (control), meeting 2 (after PHS) and meeting 3 (follow-up).



The changes in the Ss' preference for writing different numbers can be seen in figure VII:2.

Figure VII:2 Average responses for ten consecutive days of the reinforced response "to write a certain number" and a low-frequency response which was not reinforced.



The increase in the frequency "to write a certain number" from the control- to the experimentperiod varied from 2.1 units to 11.9 units and was significant at the 1% level (Wilcoxon's matched-pair, signed-rank test). The increase remained unchanged during the experiment days, while the intensity in the feeling at session 3 had decreased to almost the same level as before the hypnotic programming.

All of the Ss had amnesia for the given PHS but during the experiment 4 Ss noticed that a certain number elicited a feeling of happiness. Three Ss seemed, however, to remain unaware of the relation between response and reinforcement, but these Ss changed their responses in a similar way as the other four Ss.

With respect to the experiences from this experiment a new study was designed with some improvement in the procedure:

a) No home-work, all measurements made in the laboratory.

b) To indicate a false relation between the elicit emotion and some neutral procedure in order to make the awareness of the relation response - reinforcement more difficult.

c) To try to detect any spontaneous trance, since this has significant implication for the awareness aspect.

d) To make a more extensive interview in the end also for the question of awareness.

EXPERIMENT II: PH RELEASED EMOTIONS AT REINFORCER (Ungstål et al, 1972 g)

METHOD

60 persons were tested with SHSS, form A, whereupon 6 Ss, scoring 11 - 12 points, were selected. 4 of them were naive but 2 had some previous experience of hypnosis. The Ss were told to return at four successive sessions.

At the first session the Ss were given an instruction over the experimentdesign, whereupon the Ss were hypnotized and control was made that the Ss functioned on a signal released PHS and that the Ss had amnesia after awakening. They were also asked to narrate some happy previous experience.

This 'happy event' was used at session 2 and in the same way as in experiment I connected with a certain response, this time pushing a button with a certain colour. After awakening the Ss performed a task, described below. At the third session the Ss carried out the task without any hypnotic induction and at the fourth session the PHS were removed, whereupon the Ss executed the task for the last time.

The apparatus consisted of a panel with six buttons of different colour. All buttons were coupled to a Sawyer slide projector, containing a series of 54 slides with "neutral" geometrical figures. The Ss were informed that the projected slide was dependent on which button was pushed. In reality, all slides in the series were projected by the same projector. A tape-recorder gave a tone with an interval of 30 seconds. This was the signal to start pushing a button. The frequency of "pressed buttons" was measured automatically. After pressing a button the Ss were instructed to estimate their emotional response to the exposed slide from the provided scale ranging from +3 to -3. In the first session all figures eliciting a positive response were excluded and only 42 figures with values ranging from +1 to -3 were used in the following sessions.

Experiment II - Time axis

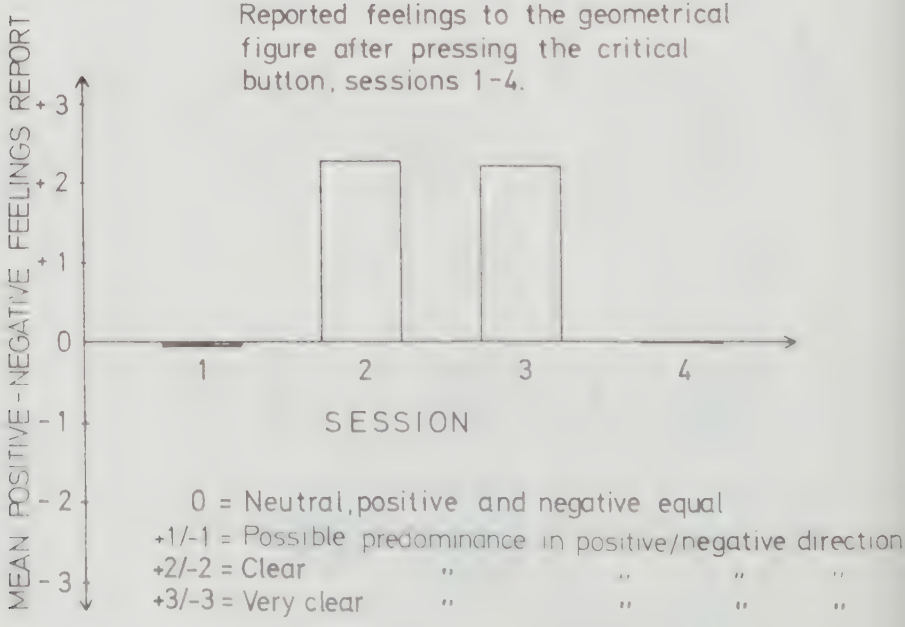
SESSION I Day 1 Control day			SESSION II Day 2 Experiment day	SESSION III Day 6 Experiment day	SESSION IV Day 7 Control day
Test of hypnotic susceptibility Control of amnesia and PHS	Pressing buttons seeing figures Rating of emotions Drawing the figures	Telling a happy event	Hypnosis PHS Control of amnesia Pressing buttons seeing figures Rating of figures Drawing the figures	No hypnosis Pressing buttons seeing figures Ratings of emotions Drawing the pictures	Hypnosis Removal of PHS Pressing buttons seeing figures Rating of emotions Drawing the figures

Every slide was exposed on the screen for a period of 3 seconds, while the feeling of happiness was programmed to work in 15 seconds. After removing of the slide, the Ss were instructed to draw the exposed geometrical figure. The purpose of this was partly to conceal the real purpose of the experiment, but also to investigate any appearance of spontaneous trance (ST), thereby providing clues to the question if learning does occur without the Ss' awareness of the relationship between the response and the reinforcement.

RESULTS

All Ss had amnesia for the given PHS and in all Ss the PHS was effectuated so that pressing a certain button released a feeling of happiness, which was reflected in the subjective ratings (figure VII:3).

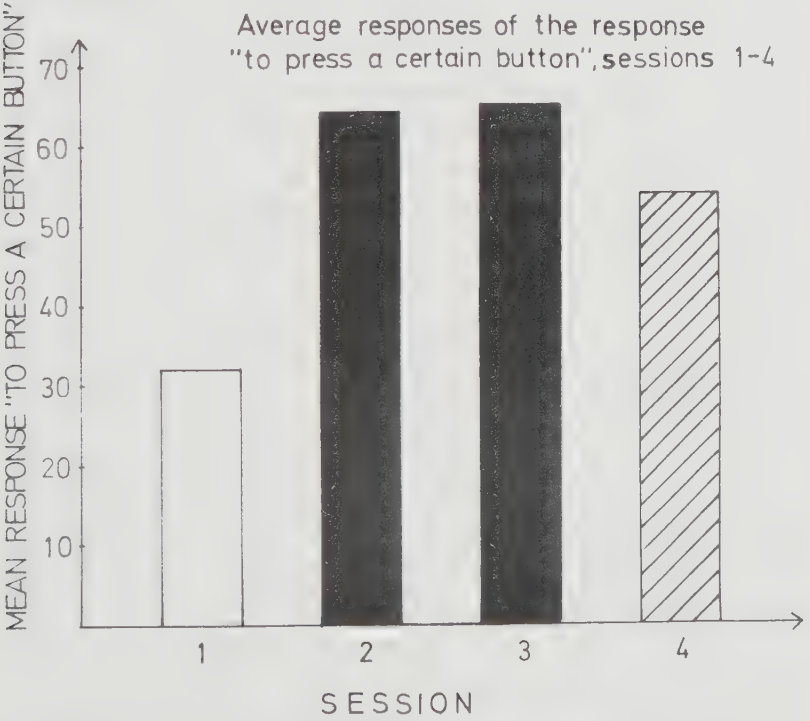
Figure VII:3



All Ss had a very clear change in rating scores during the two sessions, where the PHS were working (variations from 1.75 - 2.9). The PHS had no significant decrease in strength from the second to the third session. Two Ss had exact the same value and one S even a slight increase.

Regarding the frequency of the response "pressing a certain button" there was also a significant increase for all Ss (Figure VII:4).

Figure VII:4



The increase from session 1 to sessions 3 and 4 is significant at the 5 % level ($p = 0.05$, Wilcoxon matched-pair, signed-ranks test). The response has also sigificantly increased at session 4 (5 % level), in spite of that the PHS is here removed.

The final interview showed that all Ss seemed to be unaware of the relation response - reinforcement. The Ss could not guess the purpose of the experiment either.

DISCUSSION (both experiments)

In the two related experiments posthypnotically elicited emotions serving as reinforcers of behavior have been studied. The results of both experiments apparently show that the released emotions have a modifying effect on the frequency of the behavior. The increase of the "critical" response was significant for all Ss (Figure VII:2, VII:4). A difference can however be seen in the persistence of the increased response-frequency. In experiment I there was a slight lowering of the critical responses for the majority of the Ss during the 5 experiment days. In experiment II the increase was unaltered during the experiment, which had about the same duration as experiment I.

The Ss in both experiments had been programmed to feel a happy sensation during 15 seconds after the critical response. This feeling was elicited in all Ss and to a very clear extent (figure VII:1, VII:3). Even here the ratings persisted at the same level in experiment II, while they decreased in each subject during the experiment week in experiment I, so that the estimates were at meeting 3 almost at the same level as at meeting 1.

At the last session the PHS were removed in all Ss, whereupon a new control of the critical response was made in experiment II. In spite of ratings showing that the Ss were no longer reacting to the previously provoked emotion, the response was still at a significant higher frequency. Thus, the occurred learning lasted even without this kind of reinforcement.

The hypothesis that the reinforcement can be effective even without the Ss awareness of being reinforced has got a positive support. The 3 Ss in experiment I who remained unaware of the relation response - reinforcement had also a significant increase and as the relation response- reinforcement was made still more diffuse in experiment II, non of the Ss got aware.

None of the experiments was designed to measure spontaneous trance (ST) but as one criterium of ST is amnesia and as the Ss in experiment II were asked to draw the figure they just had seen on the screen, then this procedure could be used as one indicator of ST. Only one S made wrong pictures of some of the reinforced figures, while drawing everything else perfectly. Four conceivable explanations to the weak result in this respect are:

a) ST did not occur in this experiment
b) ST may have occurred but during less than 3 seconds, which means that the Ss will still remember the figures
c) ST occurred and lasted more than 20 seconds, and therefore the Ss drew the figures, still in trance.
d) The perception of the figure can be transferred from ST to non-trance

From experiment I can be reported that the S with the lowest increase in response-frequency explained this low increase with the statement that she found it unpleasant to enter the state of trance that she felt followed upon the critical number.

Before applying these methods in clinical settings some further questions have to be answered. In these investigations the releasing of emotions was limited to positive ones. Will negative feelings like discomfort, which can be needed in treatment of problem behavior, have the same results? Here only high susceptible Ss were used. Can the method also be applied to less susceptible individuals? Here the experiment period was very short. Will the results be persistent also in a longer follow-up? Here the reinforcement was followed after each response. Can other forms of reinforcement schemata be programmed with this method?

The advantage with using PHS in this area is obvious. Compared with the methods of "token economy" this method is administratively much more simple. That is valid even compared with Cautela's technique, which needs long and intensive training. A "token" is not reinforcing in itself, it is only reinforcing to the extent that it causes a positive feeling. The PHS-method does not need this roundabout way, it creates directly the desired feeling. "It gives also a better control over: (Uneståhl, 1972 b).)

1) The kind of effect
2) The intensity of the effect
3) The duration of the effect
4) The exact point of time for releasing the effect.

By using the behavior as the releasing signal, the positive or negative effect, serving as reinforcement for the behavior, will appear immediately and automatically with no need for the therapeut or any other person to be present.

This chapter has shown:

1. A behavior can be given signal value during hypnosis and then serve as a cue, eliciting a programmed emotion.
2. A positive emotion can be separated from a previous event and bound to a certain behavior, which will release the emotion during a fixed number of seconds.
3. After programming such a reinforcer, the "critical" response increased significantly in both experiments.
4. The increase of response-frequency seems to last as a result of learning even after removal of PHS.
5. The reinforcement was effective even for the Ss who never got aware of the relation response - reinforcement.
6. In spite of some limitations the method has great advantages compared with "token economy" or "covert reinforcement".

CHAPTER VIII. MEASUREMENTS OF POSTHYPNOTIC EFFECTS.

Hypnotic research has above everything been concerned with the investigation and the explanation of the hypnotic state, various hypnotic phenomena and the susceptibility to hypnosis (experimental hypnotic research). In recent years, however, hypnosis has been increasingly used as an experimental tool to study other problems in psychology (instrumental hypnotic research). Not only has research on hypnosis produced results of value in other areas not involved with hypnosis, but hypnosis itself is an experimental tool which gives uprise to new research areas and offers ways of answering questions that might otherwise seem insoluble. The point is simply this: If a legitimate psychological problem can be solved better by using hypnosis than by using other approaches, then hypnosis should be used. This is not hypnosis for the sake of hypnosis, but hypnosis for the sake of advancing psychological knowledge.

Especially posthypnotic suggestions of the B-type can be of considerable value for research in many fields as they offer a tool to influence the waking state and create such general states that it is often difficult and sometimes even impossible to create with a non-hypnotic experimental procedure.

In this chapter four experiments will be shortly described, in which subjective states of alertness, fatigue, motivation, self-confidence etc. are induced and controlled by PHS. The subjective feelings, as a dependent variable in relation to PHS as independent variable, are then in their turn considered as independent and the effect of these states on the dependent variable, different aspects of behavior or physiological reactions, are measured.

The four investigations are·

1. Posthypnotically induced fatigue.
2. The effect of motivation and selfconfidence at a physical work test.
3. The effect of different posthypnotic suggestions on car-driving in simulator.
4. Physiological measurements of hypnotically induced emotions.

I. POSTHYPNOTICALLY INDUCED TIREDNESS (UNESTÅHL 1968,b).

Despite the fact, that everyone has experienced fatigue, it is both a complex and difficult phenomenon to define and so far no satisfactory definition has been found. Three related phenomena are included in the concept.

1. Fatigue as subjective experience, going from more localized sensations over to a generalized sense of drowsiness and decreased arousal.
2. Physiological fatigue, encompassing changes in organic functions and production of chemical substances.
3. Performance fatigue, an external manifestation in form of reduced output (work decrement). This can be measured as decrease in amplitude, speed or precision.

The changes in performance can be measured by:

a. Measuring the task continually.

b. Periodical input of a task during continual work.

The second method is less influenced by effects of practice, motivation or boredom.

Bartley and Chute presented already 1947 over 30 theories of fatigue and several more have appeared since then. In the textbooks about fatigue (Smidtke 1965, Kleitman 1953, Oswald 1952, Floyd and Welford 1953, Bartley and Chute 1947) there is not one theory covering all phenomena of fatigue. Different researchers have stressed different aspects, for example (Bartley 1947):

1. "Fatigue seems to be one of those phenomena containing a complicated social component which we cannot reliably measure but which we have no difficulty in recognizing. A subject's simple statement that he is fatigued is a primary datum and very much more reliable than any measurement yet suggested in this symposium." (G. Waid)
   "The subjective feeling is not a symptom on fatigue but fatigue itself." (Bartley)
2. "Fatigue is a general sensation, which is felt in the muscles and joints all over the body. It is believed to be due to the accumulation of waste products in the blood." (Goodenough)
3. "Fatigue is the reduction in the output of work as the result

of work and which is recoverable by rest." (Poffenberger 1942)

H.O. Lisper (1966) prefers to speak about fatigue in terms of activation, direction of attention, level of stimulation, physiological fatigue, muscle fatigue, general condition, expectancy and taskdemands.

The most common method in experimental production of fatigue is sleep-deprivation. Wilkinson summarized 1958 the results from sleep-deprivation experiments by saying that earlier investigations had not in any way showed any effect on performance by sleep-deprivation. Since then many studies have been made stressing the output. The effect of sleep-deprivation has illustrated a decrease when the subjects were given more stimulating tests, by feedback, by decreasing the predictability of the tasks or by increasing the value of reward for the tasks. The task duration also seem to be very important. Summarizing his experiment Wilkinson (1964) point out that no significant decrease in efficiency even after long deprivation periods has been noted in tasks and tests shorter than ten minutes.

METHOD

10 susceptible Ss took part in the first experiment, while 6 Ss with no pre-screening for hypnosis participated in experiment II.

Subjective ratings were made but the emphasis was put on different performance-tests; in experiment I reactiontime, numerical speed and visuomotoric speed and in experiment II perceptual speed, motoric speed, word in one minute, short time memory, rated eye level, time-estimations and flicker fusion.

The reactiontime (RT) was measured by foot reactions to auditive stimulation. The subjects foot was fixed in a certain position near the contact. The auditive stimuli were spaced by a timer, where the duration between two stimuli was determined by the discharge course in a condenser. After every stimulus a relay changed the pause resistance (22 different), thus different intervals between the stimuli were obtained. By a switch one could shift between four different condensers and in this way a linear time extension was obtained between the various inter-stimuli-intervals. An impulse from the timer gave the signal and started at the same time a decade counter. Pushing the contact gave a stop impulse to

the signal and the counter. The RT was automatically delivered by a Kienzle printer. The position 1 on the timer was used.

Posthypnotically induced fatigue was in the first experiment compared with "normal" and in the second experiment with "normal" and posthypnotically induced alertness.

RESULTS

Experiment I

Subjective scalings were used to show that the PHS were effective figure VIII:1

Figure VIII:1 Estimations during exp. I (groupmean 10 Ss).

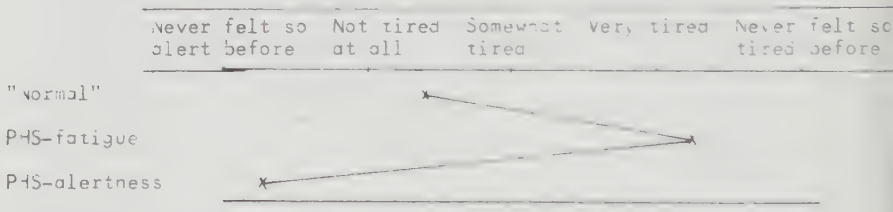


Table VIII:1 RT during normal and posthypnotic fatigue (msec)

	Mean	Median	Deviation	Mean (1-50)	Mean (50-100)
"Normal"	354	345	61	337	372
Fatigue	602	577	143	577	627

The RT-measurements give a very clear and significant difference between the two conditions. Also the deviations increase during fatigue and the increase is larger than for the mean. The index $\frac{T}{M}$ is for "normal" = 0,17 and for fatigue = 0,25. A comparison between the means and the medians shows that the distribution of RT-values is in accordance with normal distributions. The medians are generally somewhat lower than the mean, i.e. the distribution is somewhat positively skewed. The skewness coefficient is for the "normal" condition = 0,46 and for the fatigue condition = 0,49. Calculations of the medium faults of the means also show that all median values

are inside the limits of the probable error of the means (5 %). A comparison between the RT-distributions for every subject also shows good accordance between the two conditions.

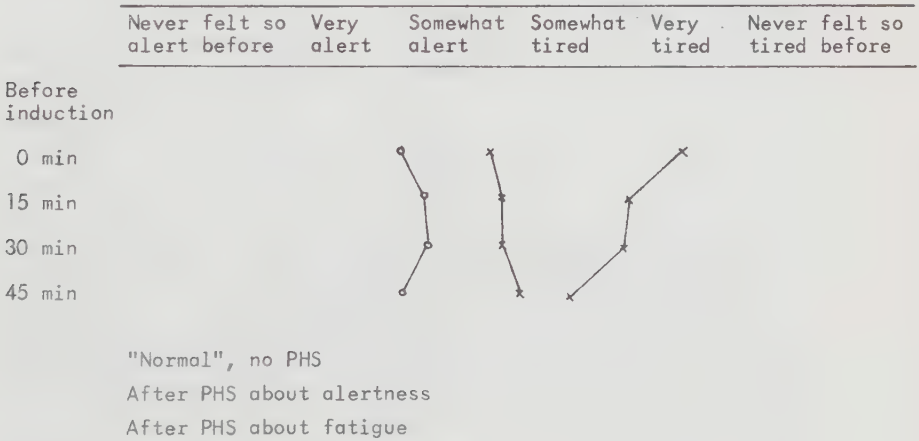
The results on numerical speed show a 30 % decrease (4 % - 59 %) in number of counted tasks (sign. 1 %) in the fatigue condition. A small, not significant, increase of number of faults appeared. A small, but not significant increase in time, appeared also in the test on visuomotoric speed during fatigue.

The Ss were ranked according to their degree of change in results from "normal" to fatigue. The highest correlation appeared between subjective ratings and reaction time (0,60).

Experiment II

The subjective ratings were repeated four times in every condition figure VIII:2

Figure VIII:2



Some ratings on the scale for subjective experience analysis (Dureman) have been presented earlier in chapter III. In order to get an opinion of the subjects motivation, they had to estimate how interesting or dull they found every task. Only small changes could be seen between the three conditions and from session one to the

third and last session.

Table VIII:2 The results on performance tests during exp. II (6 Ss).

	"Normal"	Fatigue	Alertness
Numerical speed-number (faults)	39,3 (3,3)	38,7 (3,7)	44,7 (1,7)
Perceptual speed-number (faults)	80,8 (3,0)	78,2 (2,3)	82,2 (3,0)
Motoric speed-number	253	252	263
Number word in one minute	40,6	42,0	48,8
Rating of eye-level	165,0	163,8	164,2
Short term memory (CUB)	18,2	17,0	17,3
Flicker fusion	44,0	43,2	43,8
Time-rating (sec.)			
[redacted]			
Objective time / Subjective time			
5	4,3	5,4	3,7
15	11,4	13,7	11,1
30	21,1	25,4	22,3
60	40,0	46,5	41,5

Very small differences between the conditions appear in experiment II, especially in the performance tests. The deviations in the subjective ratings are also smaller than in the first experiments. This may be due to the selection of subjects as only the Ss in exp. I were selected according to their susceptibility to hypnosis.

DISCUSSION

In investigating the effect of fatigue on performance and experience previous studies had tried to create the sensation of fatigue by using certain procedures such as preventing the subjects from sleeping. In these two experiments PHS were used to elicit the desired feeling, fatigue directly. Hypnosis is here only used as

a tool for inducing and controlling experiment variables. The effect of the hypnotic procedure was checked by various subjective estimations both of variables, directly corresponding to the given PHS, but also of variables, covering other dimensions of the elicited state.

The effect on performance was much larger in exp. I. This can not only be a result of the fact that other tests were used, as the result on numerical speed, being measured in both experiments, decreased 30% in exp. I during fatigue but did not change at all in exp. II. The difference in results is probably due to the selection of Ss, in exp. I selected according to susceptibility to hypnosis but not in exp. II.

Among the capability tests the biggest effect was observed when measuring reaction time when an extension at on average of 250 m/sec. appeared. This must be regarded as remarkably large since the delay in time measured even at very long deprivation times seldom is beyond 100 m/sec. The extension of RT in these experiments was mainly the result of some very long reaction times (blockings). The mean increased while the median remained rather unchanged, the normal distribution of RT was, after sleep deprivation replaced by a more distorted distribution. After posthypnotically induced tiredness on increased RT was apparent right from the start. This is not as in sleep deprivation caused by some very long RT:s but depends on a general reduction of the reactivity. The distributions and the form of the curves are similar for the Ss in the different conditions. The median increased almost as much as the mean and the skewness coefficient is only slightly larger during fatigue (0,49) compared with "normal" (0,46). The correlation between the estimated experienced increase of fatigue and the extension of reaction time was 0,60.

In experiment II some differences in time-estimations appeared. During fatigue there was an increase of the subjectively experienced time. As the Ss normally underestimated the time and still more being alert, the best accordance between subjective and objective time is obtained during fatigue.

The method of inducing fatigue by PHS is administratively much simpler than the use of sleep deprivation. These latter expe-

riments are very laborious for both the subjects and the experimenters and they do not always create the desired state in spite of long deprivation times. The fluctuations of the wakefulness level are often of such magnitude that the Ss do not feel tired at the moments of testing. PHS give a better control over the subjective state and give also a possibility to vary the elicited psychological state in regard to initial strength, working level and working duration.

II. THE EFFECT OF MOTIVATION AND SELF-CONFIDENCE AT PHYSICAL WORK-TEST (Ahlestål, 1970, c).

Earlier investigations have illustrated that physical capacity increases when the Ss are highly motivated (G. Borg, 1964, 1967). Gunnar Borg has proposed that the motivation for work = real motivation - expected performance. Establishing a relation between motivation and performance is however aggravated by the fact that the relation can be supposed to vary according to type of performance. "It is to be expected that no clear linear relation exists between performance and motivation and that for some types of activities the relation is clear curvilinear relation" (1973, c).

The few investigations in the area, especially concerning self-confidence and performance variables, can be explained by the difficulty in manipulating motivation and self-confidence variables when the technique of PHS is not to be used.

METHOD

In this experiment, where 10 medium and high susceptible Ss participated, the motivation and self-confidence variables were varied and combined in the following way:

A. Low self-confidence - Low motivation (Ls - Lm)
B. High - " - - High - " - (Hs - Hm)
C. Low - " - - High - " - (Ls - Hm)
D. High - " - - Low - " - (Hs - Lm)

The order of these four conditions was rotated among the 10 Ss. The effect of the PHS was measured on subjective scales and the effect of the subjective states was measured with a physical work-test, a clinical test where the Ss have to cycle on a ergometer-

bicycle with increasing resistance. During and after the performance EKG, pulse, heart activity and blood pressure were registered. The experiment was carried out in the clinical-physiological laboratory at the central hospital in Örebro and the physiological measurements were made by the physicians and staff nurses.

RESULTS

Subjective ratings:

1. After eliciting the PHS ratings were made on a modified version of Dureman's scale for subjective experience analysis. The results can be seen in table 8:3. The differences between the four conditions are clear but not very large. The lowest self-confidence is experienced when the low self-confidence is combined with high motivation, not with low. On the other hand is Ls - Lm the subjective state which is experienced as the most unpleasant one.
2. After the physical work-test the Ss had to rate the test in three variables and then estimate their self-confidence during the test. If the Ss' ratings on every variable, consisting of five steps, are added (0-50 points), the results will be table VIII:3

Table VIII:3 Ratings of the physical work-test and self-confidence.

(Higher points = more of the variable.)	The test was: Nice	Tedious	Interesting	My self-confidence during the test was
Ls - Lm	30	31	23	27
Ls - Hm	34	32	28	26
Hs - Lm	28	29	23	37
Hs - Hm	38	30	32	39

The states of high and low self-confidence are well reflected in the special rating of self-confidence and the levels of motivation are best reflected in the ratings of interest.

Physical work test

The results can be seen in table VIII:4

Table VIII:4 The exertion and pulse (Watt/pulse) during the different conditions. Maximal work.

S	Ls - Lm	Hs - Hm	Ls - Hm	Hs - Lm	
1	250/183	250/195	250/182	250/180	
2	300/183	300/185	300/188	300/183	
3	300/190	300/190	250/188	300/189	
4	200/187	200/182	200/182	200/192	
5	200/190	200/190	200/187	200/183	
6	350/185	259/182	300/184	-	
8	130/180	130/176	130/140	130/179	(Woman)
9	250/195	250/187	150/183	200/154	
10	150/175	200/201	200/195	200/189	
12	160/178	160/176	160/177	160/180	(Woman)

No apparent differences between the four conditions can be seen in the table. A comparison over the conditions between sessions 1 and 4 yeilds the following values (table VIII:5)

Table VIII:5 Pulse at maximal exertion.

S	1	2	3	4	5	6	7	8	9	10
Session 1	183	185	189	192	190	182	179	186	183	180
Session 4	180	183	178	182	183	164	176	154	168	176

A significant pulse decrease occurred from session 1 to 4, due to training effect.

DISCUSSION

The lack of influence of the created subjective states on the physical work test may possibly have at least three explanations; motivation and self-confidence can to a very small degree influence the results of the physical work test, the posthypnotically induced subjective states are of a different kind compared with "real" feelings, the PHS could not create the desired state in the Ss.

In order to see if the third explanation was of some importance, a follow-up was made with one of the Ss. The lack of effect of PHS, can be due either to the susceptibility to hypnosis or to the content of PHS. For that reason one of the most susceptible Ss was chosen and the content of PHS was somewhat modified. The content was more intensively emphasized, the description was made more in detail and the sentence: "You will always make your best" was removed and instead given after hypnosis. The result was that the subject rated the subjective variables with maximum deviations (100).

The result compared with the previous sessions:

Ls - Lm	Hs - Hm	Ls - Hm	Hs - Lm	Ls - Lm (follow-up)
160/178	160/176	160/177	160/180	130/162

The subject first refused to work at all, but agreed after a while to make a try. Reaching an exertion of 130 W she reported that she was completely exhausted and refused to continue. She had not by then reached enough pulse-rate required for the maximum exertion. The pulse at 130 W was however consistent with previous pulse-rate at 130 W.

Thus the third explanation can be doubted. As other experiments have indicated that posthypnotically suggested feelings are experienced as "real", the first explanation is probably the most important, i.e. the level of motivation and self-confidence developed in this experiment, does not seem to influence the result of the physical work test in such a way that the differences between the conditions will be significant. This gives rise to the pending need for exploring the exact relation between these two variables and different kinds of performances.

THE EFFECT OF DIFFERENT POSTHYPNOTIC SUGGESTIONS ON CARDRIVING IN A SIMULATOR (Uneståhl, 1968 c).

METHOD

Conditions

After a practice session in the driving simulator, the subjects were tested under nine different conditions:

1. Normal
2. Increasing fatigue
3. Alertness
4. Anxiety
5. Self-confidence
6. Lack of self-confidence (diffidence)
7. Drunkenness
8. Hypnosis
9. Normal

Each condition included:

1) Induction of hypnosis with posthypnotic suggestions about the character of subjective feelings after waking.

2) Subjective scaling

3) Seven minutes' continuous driving (driving for seven minutes)

4) Description of the subject's state while driving.

Each experiment started with a "normal" condition, or control, and ended with a condition which was identical to the control condition in every respect, with the exception of the presence of posthypnotic suggestion. These two conditions are designated "1" and "9" respectively. All other conditions, those designated 2-8, were presented so that the order was varied between subjects. The group mean of the varied conditons was kept constant, however. Condition eight, hypnosis, was followed immediately by the simulated

driving conditions, with no intervening, waking period. No subjective scaling was done during this period.

Measurements

A. Subjective scaling

A scale for the subjective analysis of experience (Dureman,) was used.

B. Behavioral variables

1) Brake reaction time in msec.

2) Number of times subject drove off the road.

C. Autonomic measurements

1) Pulse

2) Respiration

3) SRL

4) SRR

Apparatus

A. Car simulator

The subjects sat in a comfortable chair in front of the simulator. From this position, the subjects could see a black road, 3 cm wide, through a round window, 8 cm in diameter, that was located on the simulator's front. The 1 cm wide car was connected to a steering-arm that had two photo-electric cells which were activated when the car left the road which subjectively appeared to wind and curve and straighten. Every time the car left the road, an automatic device registered the event and produced an auditory signal. Speed and visibility were not varied during this experiment.

B. Instrument for measurements

1. Reaction time

The auditory signal was presented randomly by a tone generator.

The reaction time was recorded by a decade-counter.

2. Heart rate

A small lamp and a photocell were placed on the subject's ear.

Subjects

Six students were selected from forty subjects on the basis of their scores on the Stanford Scale of Susceptibility. Only subjects with the maximum score (12 points) were chosen, because of the necessity of achieving a state of amnesia in respect to certain suggestions.

RESULTS

All subjects reported that amnesia resulted from the posthypnotic suggestions. The posthypnotic states affected the three types of measurements: subjective scaling, physiological measurements and behavioral variables. The results of the physiological recordings will be related in chapter IX.

A. Subjective scaling

The mean rates for all conditions are presented in Figure VIII:2. Figure 1 shows rather large differences between rates measured under different conditions. Half of the thirty-six mean rates fell between the categories "Moderate but quite clear difference" and "Marked difference".

B. Physiological measurements

The values on the four measures during different conditions can be seen in table VIII:5.

Ratingscale for subjective experience-analysis

Figure VIII:5 Subjective ratings during six posthypnotic conditions.

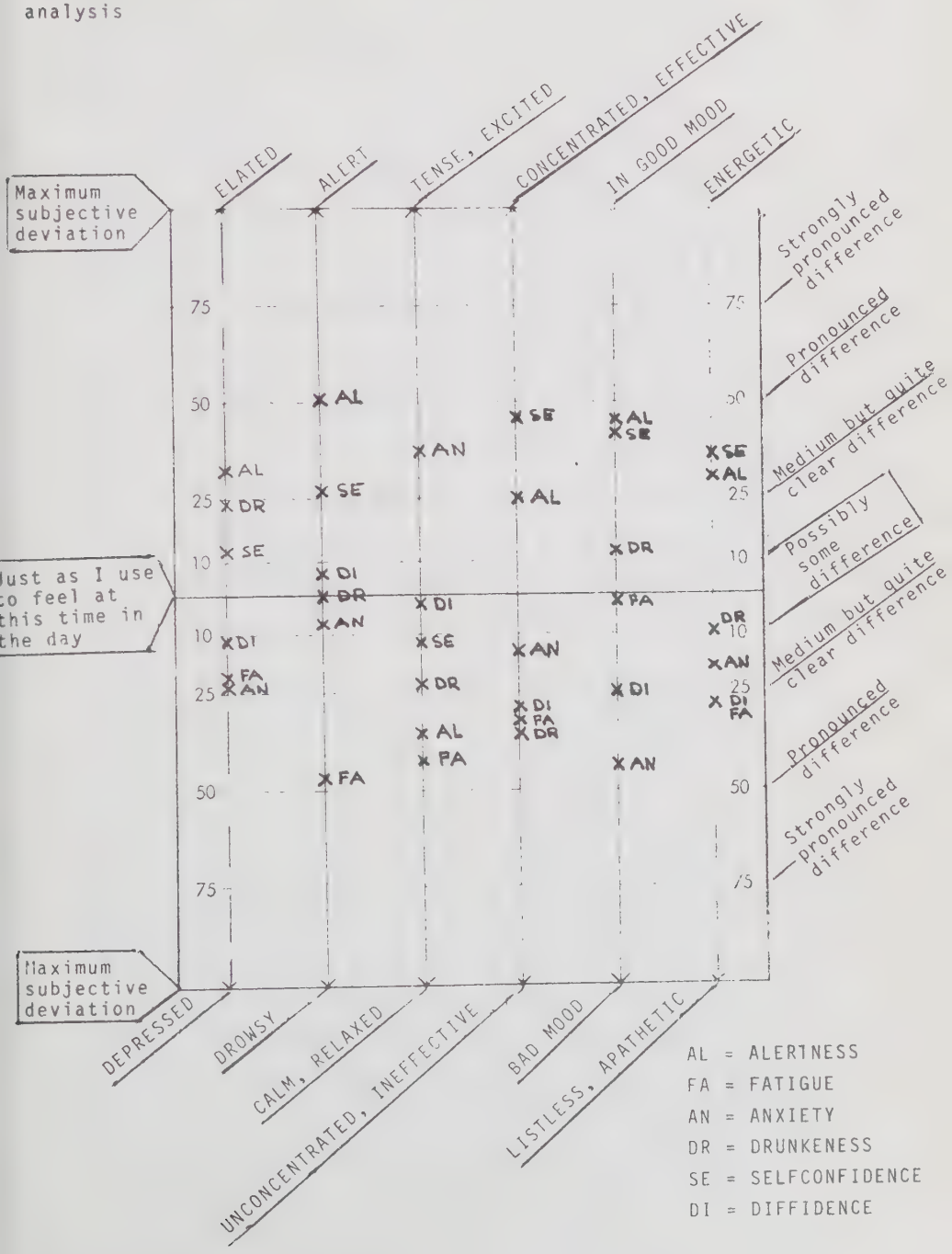


Table VIII:5 Physiological measurements (Means Ss - min.)

Condition	Breathing	Pulse	SRL	SRR
Driving	20.3	89.5	51.0	6.9
Hypnosis induction	12.0	87.0	51.3	2.2
Posthyp. suggestions	14.1	89.5	54.9	4.5
Sleep	12.6	87.0	53.1	5.0
Sleep (last minute)	12.4	87.0	53.8	2.4
The minute after contact	13.2	90.2	53.5	6.6

The induction and the sleep period are characterized by lower pulse and respiration, less SRR and higher SRL compared to the driving period. All measurements change towards a lower arousal under hypnosis and sleep. The greatest difference can be seen in respiration and SRR, while SRL shows rather small differences. The induction period and the suggestion period give a somewhat different picture. All four physiological measurements indicate a higher activation level in the organism during the period when posthypnotic suggestions are in effect.

The physiological scores from the sleep period are similar to those during the induction period. The figures fromtthe last minute of the sleep period show, however, a continuous decrease of the activation level.

In the moment when the contact with the sleeping subjects is reestablished, a reaction on some or all measurement varibles can be seen. The scores from the minute after establishing contact show an increase in the activation level.

Observation of the subjects under this condition indicated an increasing fatigue as typified by periods in which blinking increased that alternated periodically with periods when there was relatively little blinking. The soft, continuous wheel movements were replaced by more violent angular movements. Also, body reactions to signals (tone for driving off the road) became more vio-

lent. After several minutes the h ad began to sink forward, the eyes began to close for short periods which were broken by attempts to wake up and open the eyes as wide as possible. An interval with short sleeping periods, though the subjects still managed to stay on the road, was followed by a period when wheel movements stopped and the subjects were asleep.

At the end of every hypnotic period, the subect was told: "Now you can take three deep breaths, awake and experience w at I have told you." The number of deep breaths in connection with waking varied between three and four. Awakening time varied between 13.3 and 22.8 seconds, though some individual differences are noticeable. Awakening times seem to depend upon posthypnotic suggestions. The data in table VIII:6 seem to indicate that positive suggestions produce faster waking times.

Table VIII:6 Awakening time for different conditions

Condition	Awakening time (sec) (M_{Ss})
Drunkenness	20.0
Diffidence	18.5
Anxiety	18.3
Fatigue	17.7
Self-confidence	17.0
Alertness	15.9

The physiological changes upon awakening can be seen most clearly in SRL and pulse measurements. Deviations toward lower SRL and increased pulse rates usually come at the end of the last deep breath but have been seen to occur after the first or second breath. The size of SRL deviations vary from rather small decreases to as much as 30 K during 5 seconds. Pulse rate changes may vary from little or no change to 150 beats per minute.

Table VIII:7 The condition: Increasing fatigue and sleep.

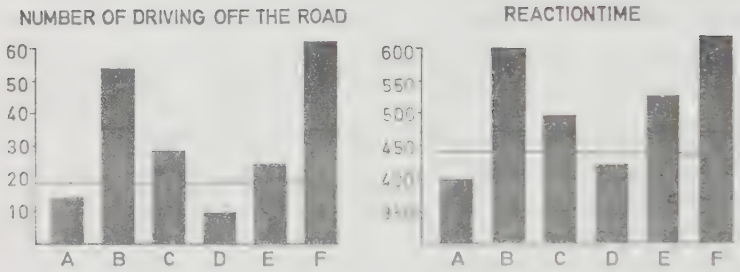
Condition	Breathing	Pulse	SRL	SRR
Fatigue (total)	17.3	87.9	59.4	6.4
Last minute of fatigue condition	17.8	93.6	46.4	7.8
The first minute of sleep	13.8	86.8	51.3	7.4
The sleep-period	12.6	87.0	53.1	5.0
The last minute of sleep	12.4	87.0	53.8	2.4
The minute after contact	13.2	90.2	53.5	6.6

The physiological scores in table VIII:7 are in agreement with the observations of subjects under the condition of fatigue. Attempts to maintain effective behavior as long as possible, in spite of continuously increasing fatigue, caused compensatory arousal (see line 1 and 2 in table VIII:7). The physiological scores under conditions of fatigue therefore change in the opposite direction to scores under other conditions.

After that, the onset of sleep progresses rapidly. This can be seen by comparison of the minute before sleep (line 2) with the minute after (line 3). During the 3 or 4 minutes of sleeping the scores indicate a continued decrease of the activation level (line 4 and 5). When contact is resumed the physiological apparatus shows one or more deep breaths, a temporary increase in pulse rate, lowering of SRL and one or more SRR reactions. Changes can also be seen in scores from the minute after contact, which would normally show the signs characteristic of general suggestions to relax.

C. Measurements of performance

The variables "reaction time" and "number of mistakes" (driving off the road) were measurements of driving ability that were strongly affected by the different states (figure VIII:3).



Cardriving in a simulator under posthypnotic induced states.

A = Alertness
B = Fatigue
C = Worry
D = High selfconfidence
E = Low selfconfidence
F = Drunkenness

a. Reaction time

Figure a shows that the values of the reaction time vary between 395 and 626 msec. The vertical line in the figure "normal behavior" is the mean of normal conditions I and II. The following conditions show deterioration when compared with the normal behavior: fatigue, drunkenness, lack of self-confidence and anxiety. The behavior is better than normal when the subjects are driving under hypnosis, when they are alert and have self-confidence.

A comparison between the first and the second part of the period show an increasing RT for four conditions and a decreasing RT for the other five conditions. There is a tendency for the RT to increase under conditions with states that are characteristically negative. The deviation scores vary between 50 and 123 msec. These variations show a strong agreement with the differences between the means.

b. Driving off the road

The number of times that a subject drives off the road shows a variation between the conditions that resembles the variation between reaction time scores. Table VIII:2 and Figure 2 show a variation from 9.5 to 63.3 for driving off the road during a seven minutes' period. Compared with the normal scores, which is the mean of normal conditions I and II, the driving is worse when the subject is drunk, fatigued, worried or lacks self-confidence; while the driving is better than normal under good self-confidence, and under hypnosis and alertness.

DISCUSSION

Of the types of measurements used in the experiment, the subjective estimations and the capability measurements show the clearest differences between the different psychological states elicited.

Of the conditions there were only two whose posthypnotic suggestions had their direct counterparts on the estimation scale, alertness and tiredness. These conditions also showed the strongest estimation deviations, namely an average of "Decided difference" from the normal state on the scale, alert, awake - drowsy, dull.

The suggestions of the other conditions did not have direct counterparts of any estimation variables, but these cover different dimensions of the elicited psychological state. Also these variables showed more or less strong deviations for each individual and this indicates that the S investigated and described his actual state and not the specific suggestion that elicited the state. This is confirmed by the subjective description and by the fact that there were Ss who upon awakening, had amnesia for the given suggestion.

The psychological state used in the experiment was elicited by

a summarizing term with no description of how the Ss were supposed to feel. The posthypnotic suggestion was, in fact, attached to each individual's reference frame, his earlier experience of the state which he associated with certain denomination. As the inter-individual accordance of the meaning and sense of words can vary considerably, it is impossible to avoid the fact that the same posthypnotic suggestion elicits somewhat different states in different individuals. The posthypnotic suggestions used in this experiment are very common and often used terms and one can presume that the inter-individual accordance is here rather good.

This assumption is confirmed by the results of the estimations where many accompanying variables, that is estimation variables, that have not been directly suggested, still show complete accordance between the Ss regarding the direction of the estimations. For instance, in the estimation variable "Concentrated, efficient unconcentrated, inefficient", all Ss rated in the same direction Alertness, Tiredness, Self-confidence, Diffidence, and Drunkenness.

The suggestion of drunkenness shows the biggest variation in experience in the Ss. This is probably due to the fact that this is a state that is objectively shown by °/oo in the blood but the experience shows great individual differences.

It was mentioned in chapter I that many investigations have attempted to describe physiological characteristics within the hypnotic state. The contradictory results depend to a great extent to the fact that too little attention has been paid to the effect of suggestions given under the hypnosis. The physiological measurements which one receive under hypnosis depend on the suggestions given.

In this experiment this was clearly seen when comparing the physiological measures from the induction phase, which contain passive suggestions (relaxation phase) and low activation level, and suggestions of a later activation (suggestion phase) with the measures from driving under hypnosis. The physiological variables showed during the driving values as high an activation as when

driving awake. A certain activation could be seen already during the induction when passing from passive relaxation suggestions to the phase where the Ss received suggestions describing the state after awakening.

The awakening from hypnosis, after the ordered three deep breaths, mostly caused evident reactions on the other physiological variables. An interesting finding, worth a closer examination, is the tendency to take longer time to awake after posthypnotic suggestions of negative character.

The differences in the physiological variables between driving under the different conditions are confused and difficult to interpret, while there are more similar differences between driving as a whole, induction of hypnosis and sleep.

Under the condition "Driving under increased tiredness" the organism is forced to compensate the increasing tiredness by a still more increasing arousal to manage the performance. The measures indicating this increasing arousal reach their maximum just before falling asleep which appeared to be very rapid.

The posthypnotic suggestion about falling asleep after 5 minutes' driving belongs to suggestions of type 2 which concerns effectuation that is a delay decided in times. The investigations that have been done on this type of suggestion discuss the often amazing certainty with which the S executes the suggested act at the decided time. In this case, there is a delay of an average of 30% before the Ss fall asleep. This may be connected with the fact that at the time estimation a change in the relation subjective - objective time at tiredness occurs.

Considerable effects of the induced psychological states have been recorded on the capability variables as reaction time and driving off which were taken as indicators of the car-driving ability in simulator. A difference of more than 0.2 sec between the best and worst conditions, according to effort, must be regarded as remarkably large compared with, for instance, earlier investigations on the influence of tiredness on reaction time during driving in simulator.

The number of drivings off the road was in the same way, six times larger under drunkenness than with the condition of maximum capability.

In regard to both reaction time and the number of drivings off the road, the worst capability was found under the condition, Drunkenness, followed by Tiredness, Worry and Diffidence. Under three of the conditions the capabilities were better compared with the normal capability. These conditions were Self-confidence, Hypnosis and Alertness.

An interesting result is the great importance that the level of confidence seems to have on capability. Under the condition Self-confidence the best result was reached both in regard to reaction time and drivings off, while the result was considerably worse under the condition Diffidence. The difference between these two states was also clearly reflected on the subjective estimations and in the subjective descriptions.

The measure variables regarding capability used in the experiment, reaction time and number of drivings off the road, show, as can be seen, a very close accordance.

The method of using post-hypnotic suggestions to induce different levels of Alertness, Motivation, Self-confidence, different Emotions, Conceptions and so on is administratively simpler than arranging a certain experiment situation and hoping that the S will be influenced towards the wanted state. As the individual reactions in the same situations can vary very considerably, it is clear that this must be a more adequate method to elicit directly the wanted state.

The disadvantage of picking out people susceptible to hypnosis for these experiments is decreased by the fact that this ability seems to be dependent upon so few other factors. Investigations in this area show that a group picked out after the criterion "Susceptibility to hypnosis" shows, for instance, the same spreading of personalities as any other group.

MEASUREMENTS OF HYPNOTICALLY INDUCED EMOTIONS (Uneståhl et al., 1972 i)

There have been mainly three ways of creating emotions. Most investigations are made in a laboratory where the conditions in the situations are manipulated in order to develop emotions. Another way is to let the Ss take part in different activities, often outside the laboratory, supposing that these activities would create the desired emotions. There is a large uncertainty in these mentioned techniques, as many irrelevant variables have an opportunity to influence.

A third way of creating emotions is using hypnosis. Levitt et al. (1964) mention some advantages with hypnotic techniques in the research about emotions.

1) Variations in emotional states can be induced quickly and be terminated under control. Control is also obtained over the durability.
2) Amnesia can be induced for experiences with anxiety.
3) Carefully constructed instructions can create relatively "pure" emotioned states. Other procedures usually arouse a mixing of many feelings, which complicates the correlations between changes in emotional states and psychological or biochemical variables.
4) The variations in the emotional state can be prolonged or intensified. The intensity can be increased or diminished during the run of the experiment.
5) The procedure can be repeated in one and the same subject, which makes testing of the reproducibility possible.

Levitt (1964) made many experiments with hypnotically induced anxiety (measuring plasma hydrocortison etc.) and found that the results were better than with all other artificially created anxiety.

True Stephenson (1951) controlled EEG during hypnotically induced positive and negative emotions but found no differences compared with a control group. Black and Friedman (1968) found differences in pulse and blood pressure but not in plasmahydrocortison-level. This was valid for all Ss except one, who had a very remarkable in-

crease. Black and Friedman claim that most Ss had a "cold" emotion, but that the induced emotion sometimes can be real enough to produce a change in plasmahydrocortison.

Thus it seems as if hypnotically induced emotions are enough "real" to cause changes in such physiological measures as pulse, bloodpressure, respiration etc. but regarding changes in EEG or

The methods for induction of the emotion can vary in complexibility and specificity of the suggestions. Erickson (1944) describes a method where he creates the emotion by a story with thousands of words fitting to every subject's earlier experiences, while Gidon, Frank and Bull (1950) use a simple and unpersonal method, linking the emotion to one single word, for instance fear. All variations between these two extremes can be seen.

Another technique is to let the Ss reexperience some events in the past and then condition the aroused emotion to some neutral stimulus (Uneståhl et al., 1971 e; 1972 g). Barendregt and van Dam (1969) conditioned different emotions to tunes of different frequency and could also control the intensity of the emotions by varying the amplitude of the tune. In the same way Uneståhl (1974 c) varied the intensity by counting to ten and varied the type of emotion by counting in different languages.

METHOD

Emotions to be investigated, were happiness, anger and fear. Two physiological indicators were chosen, catecholmines and blood-pressure.

Eight highly susceptible subjects participated. They had to go through six emotional conditions (happiness, anger and fear, hypnotically and posthypnotically induced) in a randomized order and at last a seventh neutral condition, posthypnotically induced. Thus, the Ss had to come to the laboratory on seven different occasions. Before the experiment detailed instructions were given to the Ss regarding food, activities, which could affect the excretions of hormones.

The emotions (one at every session) were created by description of three rather general situations. The Ss were permitted to connect the situation with some previous experience and they were also told to react with the desired emotion. The emotion was then separated from the situation and bound to a certain response. The Ss should write words from a word-book on pages where the lines were numbered. Writing words on certain lines should evoke the different emotions. The instruction was constructed so that the emotion should be released four times and total on one third on every page.

The subjective ratings were made on the dimensions pleasant - unpleasant and relaxation - tension, but also by marking fitting adjectives on a cheque list. The ratings were made before and after the experiment, twice during the hypnotic programming and six times during the performance.

The catecholamines were measured by urine-tests, taken after the performance, 70 - 85 minutes after a previous toiletvisit. Adrenaline and nor-adrenaline were measured separately by a two-set filter-technique, using a standard fluormeter. The analyses were

made in the Karolinska Institutet, Stockholm.

RESULTS

The subjective ratings manifested clearly the evoked emotions. The changes were largest during the hypnotic imagination, whereupon a successive decrease in the intensity occurred for most of the Ss. Some Ss had, however, persistent scoring during all the ratings.

Six of the eight Ss experienced the anger as the most intensive emotion. Half of the Ss experienced all the emotions as real, while one S had feelings of "as if". The other 3 Ss had both "real" and "as if" feelings.

The separation of the emotion from the situation functioned for all the Ss. For three people, however, the emotion returned in connection with the emotion on the "critical lines".

All Ss had amnesia not only for the hypnotic induction and programming but also for the performance made during hypnosis. Besides, 3 Ss had amnesia for the ratings made during the posthypnotic conditions, which indicates a spontaneous trance, with a rather long duration.

Instructions had not been given regarding the speed of the performance but a slight spontaneous variation could be seen (Figure VIII:4).

Figure VIII:4 Number of written pages in different conditions (M).

Happiness-H Happiness-PH Anger-H Anger-PH Fear-H Fear-PH Control

The results from the physiological meas rements can be seen from tables VIII:8-11.

Table VIII:8 Comparisons between experiment conditions and control conditions regarding A- and NA-excretion. Randomization test for matched-pairs (the table shows probabilities).

Condition	A-excretion	NA-excretion
Happiness-H	0.14	0.00 sign.
Happiness-PH	0.17	0.02 sign.
Anger-H	0.73	0.00 sign.
Anger-PH	0.59	0.02 sign.
Fear-H	0.53	0.01 sign.
Fear-PH	0.02 sign.	0.00 sign.

Table VIII:9 Comparison between hypnosis and posthypnosis over all Ss and all emotions regarding A- and NA- excretion (Friedman two-way analysis of variance. The table shows x^2-values).

Condition	A-excretion	NA-excretion
Hypnosis	3.81	0.25
Posthypnosis	2.25	3.25

Table VIII:10 Comparisons between the experiment conditions and the control condition for each subject regarding A- resp. NA-excretion and systolic resp. diastolic blood pressure. Randomization test for matched-pairs(probabilities).

	Hormones		Blood pressure	
S	A-excretion	NA-excretion	systolic	diastolic
1	0.02 sign.	0.06	0.02 sign.	0.02 sign.
2	0.03 sign.	0.09	0.02 sign.	0.02 sign.
3	0.03 sign.	0.11	0.03 sign.	0.02 sign.
4	0.13	0.02 sign.	0.02 sign.	0.02 sign.
5	0.05 sign.	0.02 sign.	0.02 sign.	0.16
6	0.02 sign.	0.02 sign.	0.02 sign.	0.02 sign.
7	0.20	0.05 sign.	0.20	0.66
8	0.06	0.02 sign.	0.02 sign.	0.02 sign.

Table VIII:11 Comparisons between amount of excretion of A and NA for each subject (Wilcoxon matched-pairs signed-ranks test).

Subjects	1	2	3	4	5	6	7	8
Diff. in A- Na-excretion	Sign. 2%	Sign. 5%	-	Sign. 2%	Sign. 2%	Sign. 2%	Sign. 2%	Sign. 2%

DISCUSSION

Hypnosis was in the beginning induced by an ordinary extensive induction method but from the second session the induction was carried out only by a signal word. No differences in subjective ratings or bloodpressure can, however, be detected between a hypnotic state induced by a more extensive induction or by a signal word.

According to Schachter and Singer (1962) a cognitive element is needed beside the physiological arousal, if an emotion shall arise. Only one of the two elements is not enough to create an emotion. In this experiment like in previous experiments (Uneståhl et al., 1971 e; 1972 g) the emotions were created through a special event but the emotion was then separated from the situation, and amnesia for the given PHS was induced. The Ss rated their feelings on several occasions, during the experiment but were also asked if they could identify the feelings more specifically. Three kinds of reactions could be detected:

a) The S began to think at the "hypnotic" situation spontaneously during the performance and could identify the emotion from this situation (s Ss).

b) The Ss experienced only the emotion but managed to bring the situation into consciousness in order to identify the emotion (1 subject).

c) The S experienced only the emotion and had difficulties in identifying the emotion (3 Ss).

Thus, there seemed to be difficulties in identifying an emotion without linking it to a special situation. This was valid for the specific emotions but not for separating the negative emotions from the positive ones where the Ss did not hesitate.

Two Ss manifested a clear decrease in intensity of the PHS at all experiment conditions while one S showed no decrease at all. In the other Ss a decrease could be seen in one or more of the dif-

ferent conditions. The diminished intensity appeared both in subjective ratings and in bloodpressure and the two measures manifested mostly the same tendencies.

The results from the measurements of the catecholamines manifested a significanct decrease of NA-excretion in all experiment conditions compared with the control. Also the A-excretion manifested the same thing, a significant decrease in the experiment conditions compared with the control. A comparison between the different emotions shows no significant difference in A- and NA-excretion over all Ss. Every subject manifests, however, a specific pattern of excretion, regarding the proportions between A and NA, which was rather stable during all conditions in spite of differences in quantity.

Compared with the catecholamines the bloodpressure manifested, on the other hand, results in the opposite direction. Seven of the eight Ss had a significantly higher systolic blood pressure during experiment conditions, while six of the eight Ss had a significant increase in the diastolic bloodpressure.

There is no simple explanation available for the deviations in the opposite direction for the two physiological measures. One hypothesis could be that the hypnotic state in itself has an inhibitory effect on some physiological functions while other measures, like blood pressure, continue to be sensitive for the different emotions during hypnosis and posthypnosis. As earlier mentioned, Levi and Pathas do not see the catecholamines as indicators on emotions in itself but rather on some other component, which is a part of the emotions. This component may have been inhibited by hypnosis. According to Patkai (1971) this component is probably the general activity. The external activity in this experiment has been on the same level in all conditions but the level of physiological activation may have been lowered during hypnosis and posthypnosis. Hypnosis is, for instance, accompanied by a limitation of the sti-

muli-field and a feeling of detachment which give the Ss less possibilities of reacting on external stimuli.

COMMENTS

The investigations related in this chapter exemplify that area of research which is called instrumental hypnotic research. The interest is here not concentrated on hypnosis or hypnotic phenomena, but hypnosis is used as a valuable tool for inducing and controlling experiment variables.

The referred investigations have differed in their character. The effect of a special created state on various measures has been studied, but also the effect on a special task of various subjective states.

SUMMARY

1. In recent years hypnosis has been extensively used as an experimental tool to study different problems inside Psychology.

2. PHS of B-type can be of considerable value as they are suitable to use for creating such general states which non-hypnotic experimental procedures have difficulties to produce.

3. The four investigations related in this chapter exemplify both the effect of a special subjective state on different measures and the effect on a special task of various produced emotions, attitudes etc.

4. The refered investigations also cover measures such as subjective experiences, performance tests and physiological measures.

5. The subjective ratings show clear and evident deviations in the direction of the suggested state in spite of amnesia for the PHS.

6. Some performance tests are considerbly influenced (RT) while other do not seem to be effected at all (physical work test).

7. The extension of RT in sleep deprivation experiments is mainly the result of some very long reaction times, while the skewness coefficient is only slightly larger during posthypnotic fatigue compared with "normal".

8. Posthypnotically produced emotional states seem to have moore influence on certain physiological measures (blood pressure) compared with other (cathecollamines).

9. The method of using PHS in this respect is often administratively much more simple than other experimental procedures.

10. The disadvantage of picking out people susceptible to hypnosis is decreased by the fact that this ability is dependent on very few other factors.

CHAPTER IX. SELF-HYPNOSIS

Self-hypnosis (SH) or autohypnosis has been used to a great extent in therapy, but almost nothing has been done in the research area. Serious research is conducted in heterohypnosis only. A thorough review of the hypnosis literature reveals that this is characteristic of the whole 20th century, while in the 19th century there was more work done on SH and autosuggestion. The literature on SH - with some few exceptions - is full of oversimplification and has a popularized, prescriptive nature.

The lack of research might be due to various factors: the denial of the concept "selfhypnosis" on theoretical basis (analytical theories); the opinion that SH is too exclusive and that very few people can learn it; the opinion that research on heterohypnosis can readily be applied to SH.

The only scientific studies found, are by John Ruch (1973), investigating self-induction and by Erika Fromm (1973), where she tried to find some phenomenological similarities and differences between SH and heterohypnosis. John Ruch measured the results of subjects beginning with SH without having any prior experience of hypnosis. It turned out that initial self-induction yielded hypnotic responsiveness scores fully equivalent to those obtained with conventional induction procedures, whether based on objective scores or subjective ratings.

Erica Fromm let 36 Ss go through two 90 minutes' hypnotic and self-hypnotic sessions respectively. For the poorly hypnotic Ss she found no phenomenological differences but findings for the group of better Ss were:

a) More idiosyncratic, primary process type, visual imagery in SH than in HH.

b) More ego divisions or splits in SH than in HH, the added disassociated part being the speaker.

c) Differences in other ego functions or in depth of trance were not unequivocal but rather in different directions for different Ss. A new study has now started to test if personality factors can account for these differences.

The lack of research does not prevent many opinions to exist about SH. Some authorities consider SH as a function of "real" hypnosis (HH), a function of the experiences and expectations which the Ss bring from heterohypnosis. Others seem to switch the argument and consider HH as a form of SH. Even if an outside hypnotizer gives the instructions, the subject does not function as an automaton since he is capable of converting the given suggestions and is able to take over the conductance whenever he wishes to do so. That a person cannot reach similar depth in SH as in HH seems to be a not unusual statement. One reason being, that since the subject is his own self-hypnotizer, he has to play both an active and a passive role at the same time. The retention of a certain degree of conscious control and activity should prevent the subject from reaching a greater depth.

To find answers to this and many other questions, two studies have been carried out. (Uneståhl et al., 1974 e and f).

A STUDY IN SELF-HYPNOSIS I AND II.

METHOD

In the first study, 16 Ss, 11 females and 5 males, age 17-47, all naive for SH and 5 also with no prior experiences of HH, were given a tape with hypnotic induction and programming of SH. The procedure for SH was repeated on the backside of the tape (waking listening). After three sessions, listening to the tape, the Ss were told to try SH themselves. After additional sessions with the tape the Ss had to go themselves and to use SH on at least 30 occasions. During the period of investigation, which lasted from 3-6

months, 7 comprehensive questionnaires were answered. Experiments concerning time estimations, the induction procedure as a voluntary-involuntary process and pain influence, were carried out.

In the second study 13 Ss, who had an earlier experience with SH lasting from one month up to 6 years, were included. After a few pretrials the main experiment was carried out at one session. The procedure is presented in relation to the results.

RESULTS

Depth of hypnosis

The Ss in the first study have described in the minutest details what happened when they tried SH for the first time. To summarize some had better success than they had expected, but most of the Ss had worse results than when they had been listening to the tape.

After 5 SH when they had approximately the same experience of SH and HH time wise, the Ss were asked to compare SH - HH. The result shows very small differences in most variables, with the exception that the Ss experience SH as somewhat more tedious and that they are more easily influenced by disturbing elements in the environment. Also the results from the second study (table IX:1) indicate that SH and HH do not differ in regard to the depth of hypnosis.

Table IX:1 Depth of hypnosis in SH compared with HH

Experience of SH	Deeper in HH	Same Depth	Deeper in SH
Up to 1 month	1	5	1
More than 1 month	0	5	1
Total	1	10	2

Regarding the question on the change of depth during SH, over half of the Ss have the experience that the depth has fluctuated from time to time.

Table IX:3:I Ratings of self-hypnosis compared with heterohypnosis after 5–30 training sessions. 16 Ss.

A. Percentages

a)

SH goes	1 much better	2 somewhat better	3 the same	4 somewhat worse	5 much worse
After 5	0	19	44	38	0
trai- 10	6	31	31	31	0
ning 20	6	25	50	19	0
sess- 30	13	25	50	13	0
ions					

b)

SH takes	much shorter time	somewhat shorter time	the same time	somewhat longer time	much longer time
5	13	19	31	38	0
10	13	31	38	19	0
20	19	50	31	0	0
30	13	56	31	0	0

c)

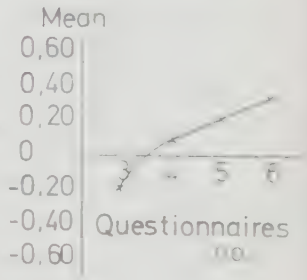
SH is	much less tedious	somewhat less tedious	the same	somewhat more tedious	much more tedious
5	0	18	19	50	13
10	6	19	25	44	6
20	13	25	31	25	0
30	13	19	31	38	0

d)

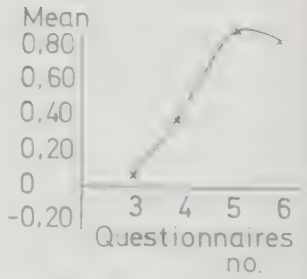
I am	much more detached	somewhat more detached	the same	somewhat less detached	much less detached
5	0	25	31	44	0
10	13	19	19	50	0
20	19	13	31	31	0
30	13	25	31	31	0

B. Change of group mean.

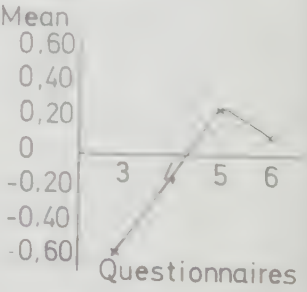
a)



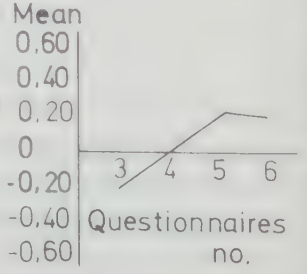
b)



c)



d)



e)

External factors disturbing me	much less	somewhat less	the same	somewhat more	much more
5	0	19	31	44	6
10	0	19	44	31	6
20	6	19	63	6	6
30	19	25	38	13	6

e)

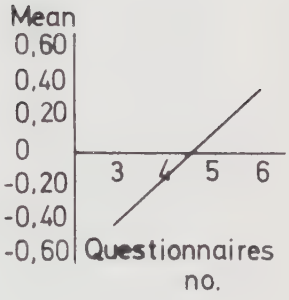


Table IX:3:11 The extent of detachment in SH.

Trainingsessions	5	10	20	30
completely detached, do not notice anything in the environment	13%	19%	19%	13%
very detached, can register things, but without envolvement	25%	25%	31%	44%
rather detached, but have almost always a certain awareness of the environment	50%	50%	50%	44%
can experience a certain detachment, but know all the time what happens in the environment	13%	6%	0%	0%
no detachment, always completely aware of the environment	0%	0%	0%	0%

Amnesia

In HH amnesia can be spontaneous or suggested. Even if the amnesia is spontaneous, it can be abolished by appropriate suggestions. An interesting question then arises: Is it possible to have amnesia a) suggested or b) spontaneous, after SH?

a) Suggested amnesia

To answer this question the Ss in the second study were instructed to enter SH and give themselves three different posthypnotic suggestions (written instructions), after which they should give suggestions about amnesia for the given PHS. The results can be seen in table.

Table IX:4 The effect of selfsuggested amnesia

Experience of SH	Total Amnesia	Partial Amnesia	No Amnesia
0 - 1 month	2	2	3
1 month - 6 years	5	4	0
Total	7	6	3

Table 10:4 shows that all Ss with a longer experience of SH had either complete or partial amnesia. One interesting thing is that the amnesia entailed even those instructions given before entering SH. Those 3 Ss without amnesia reported certain difficulties in remembering the PHS.

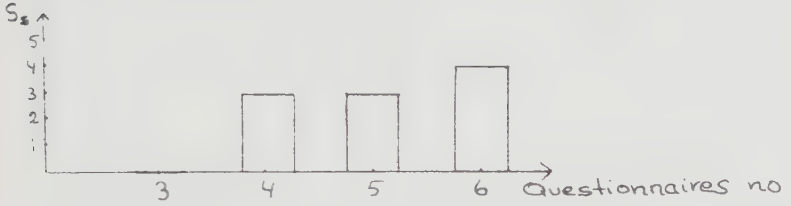
b) Spontaneous amnesia

11 Ss in the second study reported that they always remembered the suggestions and PHS they had given themselves. The other 2 Ss reported that they had had on some occasions spontaneous amnesia both for the experiences under hypnosis and for the induction.

In the first study the question was formulated: "Have you

felt so completely detached during self-hypnosis that you can not afterwards remember which instruction you have given yourself?" The percent of Ss answering yes can be seen from figure IX:2

Figure IX:2 Spontaneous amnesia in SH. Number of Ss



The question does not measure the frequency of amnesia but rather how many Ss experienced amnesia on one or another occasion.

The role of intention in SH-induction

The Ss learn to enter SH through a certain procedure. In the beginning they often modify the procedure to make it as sutiable for them as possible, but after a while the S always uses exactly the same technique from time to time. The question then arises as to what extent the process will be conditioned to the procedure?

To investigate this question 16 Ss (in both studies) were told to try the procedure together with an active effort of preventing SH, to fight against entering SH.

Ss submitted a detailed report of their experiences in this experiment. To summarize: 4 of 16 Ss could not prevent SH even if they tried. The process was so associated with the procedure so that it was impossible to separate them. One subject commented, that when the process started the will to fight against it also disappeared. Only two of 16 had no difficulties in preventing SH The other 10 Ss experienced varying degrees of resistance to fight off SH. It often created strong tension or conflict, and as

long as this tension lasted they could resist SH. One S reported that he experienced the experiment so unpleasant that he had difficulties in continuing with SH for a while after the experiment

Thus, the procedure alone seems to create the process with no intentional factors necessarily involved and with only limited voluntary possibilities to prevent the process.

Negative suggestions

Is it possible to get effect on self-induced negative suggestions? In the second study the Ss were told to enter SH and give themselves two PHS, first that a figure between 0 and 9 should be blocked, and secondly that they should feel toothache. Both PHS should be working during the 10 minutes after awakening. The results are shown in table IX:5 and table IX:6.

Table IX:5 The effect of PHS about blocking

Experience of hypnosis	Complete blocking	Partial blocking	No effect
0 - 1 month	3	4	0
1 month - 6 years	5	0	0
Total	8	4	0

Table IX:6 The effect of PHS about toothache

Experience of hypnosis	Strong toothache	Weak toothache	No effect
0 - 1 month	4	3	0
1 month - 6 years	0	4	1
Total	4	7	1

Blocking phenomena will be discussed in more details in the next

chapter. Only in 1 of the 12 Ss the PHS about toothache effect was not manifested. This subject reported afterwards that he was scored I this suggestion, but that he still induced it. The purpose of this experiment was to see if it was possible to self-induce something unpleasant. However, the instructions did not say anything about the extent of the toothache, which gave the Ss the possibility to induce it in a low degree. Only 4 Ss experienced it as clearly unpleasant.

The influence on pain

A special investigation was made of the Ss who had used SH in connection with pain, 7 Ss in the first study and of those 7 Ss, using PHS for pain removal, five experienced complete loss of pain-sensation, while 2 experienced a decrement or no effect at all. On questioning when the pain returns; does it come at once or slowly, only one S experienced immediate pain return, while the other six subjects reported a gradual increase in pain sensation. In connection with this, the Ss were asked; how long did it take them from the beginning to feel pain until the pain reached full strength. One subject answered "some seconds to some minutes", one "half an hour", and 2 Ss "half an hour to one hour and a half". 2 Ss reported that they never permitted the pain to reach its maximum threshold (severe chronic pain). 4 Ss had detected that the PHS were more effective if the PHS was related to a time decision for pain return. It brought also a feeling of security. Mostly it lasted for some hours, but one subject it once during 14 days with good result.

Some questions were asked about what kind of pain was the easiest to influence. Of the suggested alternatives, the answers showed that localized pain was better than radiating, and constant better than fluctuating pain. 4 Ss were of the opinion that new

pain was easier to reduce than an old one, but 2 Ss had better success with a familiar pain. One subject remarked that pain from smooth muscles was more difficult to reduce than skeletal muscles. The Ss had applied SH during mild pains, such as menstruation, headache, migraine, tooth extraction, but also during severe chronic pain and major operations (2 Ss received no other anesthesia).

SH and heterosuggestion

One very interesting question is to find out if some external person can influence a subject in SH, for instance, by giving suggestions (heterosuggestions). To investigate this, I used the following technique: When the subject had entered SH and was giving himself PHS about blocking, tooth ache and amnesia, I contacted him with the following words: "I want you to listen to me. When you wake up you will realize that figure no. 1 is abolished; you will realize that the figure no. 1 and its concept are completely gone. Now you can continue to instruct yourself". The results are shown in table IX:7.

Table IX:7 Effect of heterosuggestion about blocking in SH

Experience in hypnosis	Complete blocking	Partial blocking	No effect
I	3	4	0
II	5	0	0
Total	8	4	0

The results were exactly the same as those of their own suggestion about blocking. All Ss, who had amnesia afterwards (table IX:4), had no recollection that I had talked to them and had given them a PHS.

Blocking of external influence

Another interesting question which is directly related to the previous ones is to investigate - if the Ss can block themselves for heterosuggestions and in this way can prevent any external person to take advantage of SH in giving them suggestions. A follow up was made of 7 Ss. The subject was told to enter SH and immediately give this suggestion: "From now on I will not be influenced by suggestions from anybody, except by those given to me by myself." After a while I tried to contact him and talk to him in the same way as at the previous session. (I chose another number). The result was that none of the Ss showed any sign of blocking for the figure I had mentioned.

The results in these studies are interesting and important as it is my firm belief that the use of SH in the coming few years will increase tremendously both in research, in clinical settings and in nonclinical settings like sports, art, and education. The resistance that some people feel for heterohypnosis, "hand over the control to somebody else" is not valid for SH, where the subject himself is both the subject and the hypnotizer. In the first study the Ss were asked if they used the word 'I' or 'you' in connection with self-suggestions. 44% used I, 25% you and 31% used both. The comments of the subject's preference in manner of addressing indicate that some personality factors like dominance - submissiveness may play a role.

Erika Fromm (1972) has suggested that the two parts of the ego in HH (Listener and Observer) will in SH split into three parts - Listener, Observer, and Speaker. This means a more active form of hypnosis, which in the beginning is experienced as rather unfamiliar and tedious but after a short training the same effect as HH is obtained. The first study shows that when one had mastered and begun to practice SH the motivation steadily increases since one continually discovers new application areas. It is an ability that most people have, an ability that they have had all their lives without using it.

The only help they need is to detect this ability.

This chapter has shown:

1) In spite of extensive clinical use, self-hypnosis (SH) is in research still a wide unexplored field.
2) SH, where the person is both subject and hypnotizer is experienced in the beginning as more tedious than HH.
3) The Ss can reach the same depth of hypnosis in SH as in HH.
4) After 30 training sessions with SH, the Ss rated SH as more positive than HH in all rating variables.
5) The Ss can induce posthypnotic amnesia for their own suggestions and for the whole SH.
6) It is possible to receive spontaneous amnesia also after SH.
7) It is difficult and for some Ss impossible to prevent actively entering SH if they follow the induction procedure.
8) It is possible to induce "negative" and undesirable suggestions.
9) After loss of pain sensation and a pain free period of some hours, a gradual return of the pain seems to be most common.
10) It is easier to influence a localized pain than a radiating one, and a constant pain is more easily influenced than a fluctuating pain.
11) During SH, the Ss are also susceptible for suggestions from external persons.
12) This susceptibility can be blocked so that no one else can give effective suggestions other than the subject himself.

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